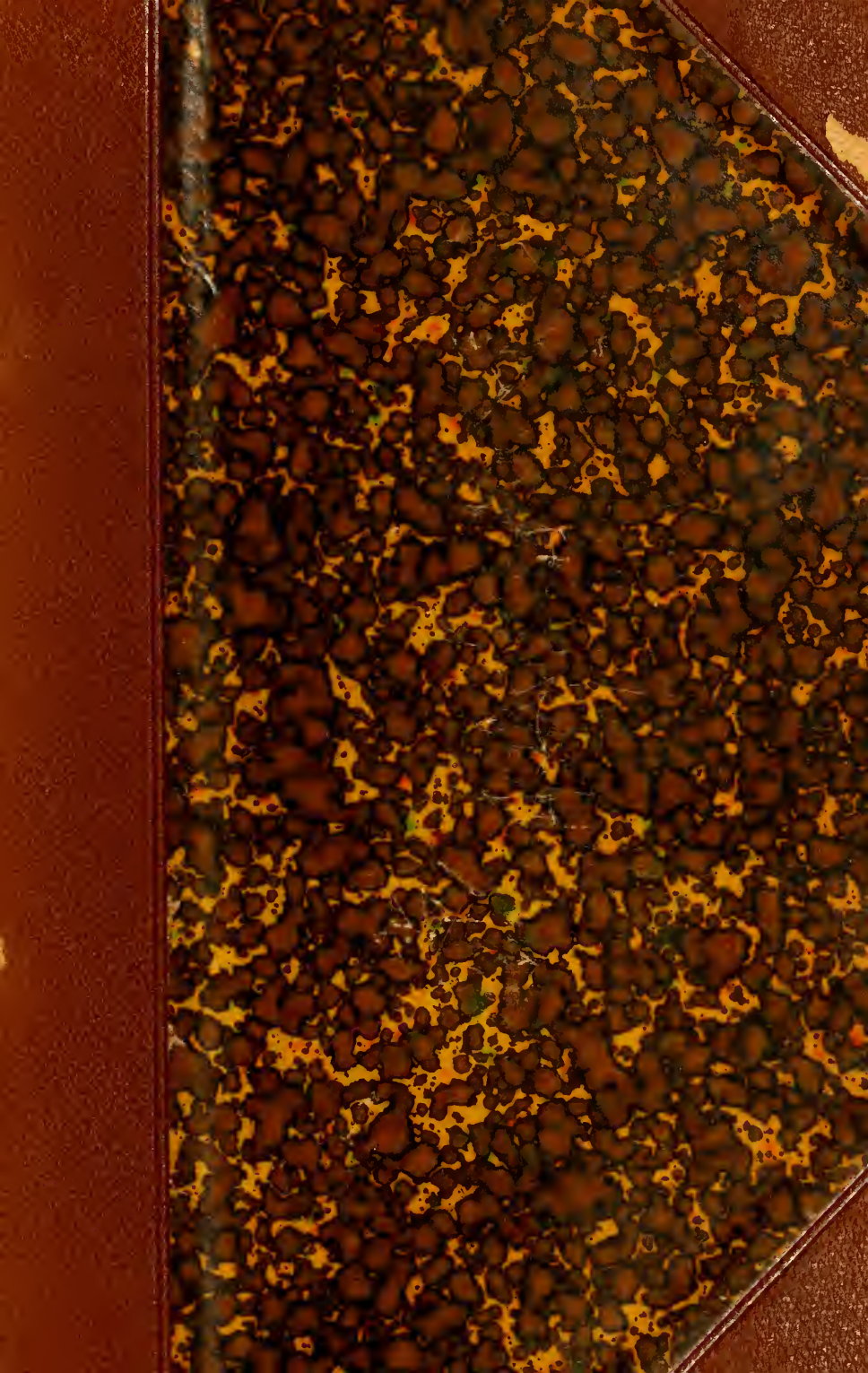

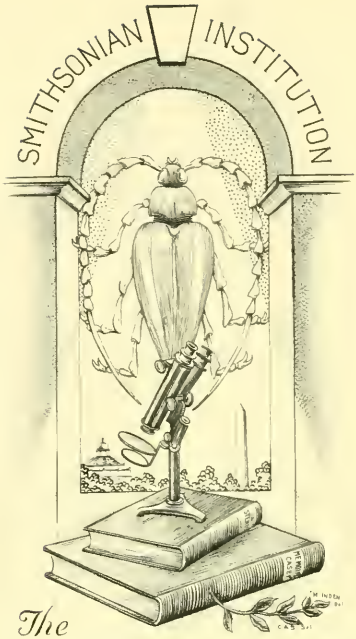

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,, 489, l. 4, for Crasimetis, n. g., read Pselnophorus, *Wallgr.*

,, 516, for *Danais liminace* read *limniace.*

,, 525, for *Kalluna inachus* read *Kallima inachis.*

,, 526, for Lybithæinæ read Libytheinæ.

,, 536, for *Leptocircus cureus* read *curius.*

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1869 Janson, Oliver E., *Perth-road, Stroud Green*, N.; and 35 *Little Russell-street, Bloomsbury*, W.C.
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1869 Waterhouse, Charles O., *Ingleside, Avenue Gardens, Acton,* W.; and *British Museum, Cromwell-road,* S.W.

1845 Weir, John Jenner, F.L.S., F.Z.S., *Chirbury, Beckenham, Kent.*

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THE

TRANSACTIONS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON

FOR THE YEAR 1890.

I. *On the South American species of* Diabrotica. Part I.

By JOSEPH S. BALY, M.R.C.S., F.L.S., &c.

[Read July 3rd, 1889.]

IN the present paper I have brought together all the South American species of the genus *Diabrotica* known to me, describing all those which appeared to be new, and re-characterising those which from the original brief and imperfect diagnoses required to be more fully defined. Since the publication of my papers on the Columbian *Diabroticæ* I have received great numbers both of specimens and species from various parts of the South American continent; my knowledge of the limits of the various specific forms has thus been greatly extended, and I have been compelled to sink a certain number hitherto considered distinct into varieties of other earlier described species. In this paper the genus is divided into groups and sub-groups, which will, I trust, greatly facilitate the work of the student. I must beg to thank Messrs. Kirsch, Meyer, P. de Borre, Fry, Jacoby, Duvivier, Donckier de Donceel, Staudinger and

others, who have kindly placed their types and collections in my hands for examination and description.

Joseph S. Baly.

Warwick, July, 1889.

Table.

Section I. Fourth joint of antennæ as long as or longer than the second and third united.

A. Elytra black, piceous or metallic-green or blue, with one or more discoidal spots, a medial fascia and the outer margin white, flavous or prasinous (one or other of these markings sometimes obsolete).

a. Elytra not longitudinally grooved or plicate below the humeral callus.

b. Each elytron with five discoidal spots, two subbasal, two medial (this pair sometimes confluent) and one subapical.

Spec. 1, 2.

bb. Elytra each with the apex, the lateral margin and a medial fascia flavous.

Spec. 3.

bbb. Elytra each with two subbasal spots, a medial fascia and an apical or subapical patch, white or yellowish white.

c. Abdomen entirely flavous.

Spec. 4—7.

cc. Apex of abdomen piceous or black.

Spec. 8—12.

bbbb. Each elytron with the outer limb and two spots placed longitudinally on the disk, white or flavous.

Spec. 13.

bbbbb. Elytra each with the outer limb, a medial fascia and a subbasal spot (this last sometimes obsolete), flavous.

Spec. 14—16.

bbbbbb. Elytra with the lateral margin, the apex and a medial fascia, flavous; antennæ pectinate in the ♂.

Spec. 17.

aa. Elytra more or less distinctly longitudinally grooved or plicate below the humeral callus.

b. Elytra each with five white spots, placed 2, 2, 1 on the disk.

Spec. 18.

bb. Each elytron with the outer border, the apex, a medial fascia and one or two subbasal spots, yellowish white or prasinous.

Spec. 19—24.

bbb. Elytra cyaneous, the outer limb and a post-medial fascia flavous.

Spec. 25.

bbbb. Each elytron with the outer limb and four spots or patches placed longitudinally on the disk and sometimes confluent, flavous or yellowish green.

Spec. 26.

B. Elytra cyaneous, the outer limb flavous, disk rugose.

Spec. 27.

C. Elytra black, each with a broad discoidal vitta and in some species a subapical spot, testaceous or white.

Spec. 28—31.

D. Elytra black, with linear or irregular flavous markings.
Spec. 32, 33.
— 9, var.

E. Elytra flavous, each with the suture at the base and several irregular discoidal markings, one humeral, one medial and one or two post-medial, piceous or black.
Spec. 34—37.

F. Elytra flavous, with irregular black markings, placed without order on the disk and frequently confluent.
a. Black markings scattered over the whole surface, the hinder disk sometimes excepted.
Spec. 38—40.
— 9 and 33 vars.
a a. Black markings post-medial.
Spec. 1, 2 vars.

G. Elytra prasinous or flavous, with small black spots placed transversely in pairs; these spots sometimes confluent and forming linear fasciæ.
Spec. 41—47.

H. Elytra rufo-testaceous, the outer limb, dilated at the apex, flavous, the suture at the base and a humeral spot black.
Spec. 48.

I. Elytra flavous, each with two annuli (often interrupted), one basal, the other post-medial, black or cyaneous.
Spec. 49—53.

J. Elytra flavous or prasinous, the base to a greater or less extent, together with one or two patches or transverse bands, black or cyaneous.
a. Each elytron with two transverse bands, one before the other behind the middle, black.
Spec. 54.
a a. Elytra with a single post-medial fascia, usually abbreviated at the suture, black or cyaneous.
Spec. 55—63.

K. Elytra flavous or prasinous, each with two short basal spots or wedge-shaped vittæ, the inner one common, together with a post-medial patch or fascia black.
Spec. 64—66.

L. Elytra prasinous, variegated with flavous; this latter colour in some species forms regular spots or patches, in others its limits are ill-defined, it becoming gradually lost in the ground colour of the disk; occasionally it covers nearly the entire surface.
a. Antennæ thickened in the ♂.
Sp. 67, 68.
a a. Antennæ filiform in both sexes.
b. Elytra with black or piceous markings, which often nearly conceal the flavous spots.
Spec. 69—72.
— 73, var. B.
b b. Black or piceous markings on elytra obsolete, the flavous spots sometimes stained or margined with rufo-testaceous.
c. Elytra not grooved or plicate below the humeral callus.
Spec. 73, 74.

c c. Elytra more or less distinctly grooved or plicate below the humeral callus.
Spec. 75—79.

M. Elytra prasinous, broadly rufous at the base, a post-medial fascia flavous.
Spec. 80.

N. Elytra prasinous, a broad discoidal vitta rufo-piceous.
Spec. 26 var.

O. Elytra flavous, rarely prasinous, each with two black or cyaneous vittæ, which extend downwards from the base to a greater or less extent towards the apex; hinder disk with black or cyaneous spots or vittulæ (sometimes obsolete).
a. Elytral vitta not extending below the medial third of the disk.
b. Inner basal vitta subsutural; each elytron with two black markings, placed transversely on the hinder disk.
Spec. 81.
b b. Inner basal vitta sutural, common.
c. Apical border of elytron nigro-piceous.
Spec. 82.
c c. Apical margin of elytron concolorous with the disk.
d. Each elytron with three black spots, placed in a triangle just before its apex.
Spec. 83.
d d. Each elytron with two black spots or vittæ, placed transversely on the hinder disk.
Spec. 84—89.
d d d. Inner post-medial spot on elytron obsolete.
Spec. 90—93.
d d d d. Both post-medial markings obsolete.
Spec. 94—98.
a a. Sublateral vitta extending below the middle third of the elytron, but not reaching the apex; it is sometimes interrupted below its middle.
b. Each elytron with a discoidal vitta, broadly abbreviated at base and apex.
Spec. 99—102.
b b. Each elytron with a short post-medial black or piceous spot, placed between the sublateral vitta and the suture.
Spec. 103—108.
— 13, var. D.
b b b. Post-medial elytral spot obsolete.
c. Sutural vitta entire.
Spec. 109—112.
c c. Sutural vitta not reaching the apical angle.
Spec. 113—121.
— 9—13, 107, 108 vars.
a a a. Sublateral vitta on elytron entire.
Spec. 122, 123.

P. Elytra flavous, each with a sutural line, a submarginal vitta abbreviated near the apex, and two linear fasciæ, black.
Spec. 124.

Q. Outer limb of elytra a different shade or colour to that of the disk.
a. Elytra green, the outer limb rufous.
Spec. 125.

aa. Elytra rufous or flavous, the outer limb green.
b. Elytra not grooved or plicate below the humeral callus.
Sp. 126, 127.

bb. Elytra grooved or plicate below the humeral callus.
Spec. 128.

aaa. Elytra flavous or fulvous, the entire limb (the sutural one sometimes excepted) black or piceous.
b. Elytra not grooved or plicate below the humeral callus.
Spec. 129, 130.

bb. Elytra grooved or plicate below the humeral callus.
Spec. 131—133.

aaaa. Elytra olivaceous, the outer margin, dilated at the apex, greenish yellow.
Spec. 134.

aaaaa. Elytra prasinous, the entire limb white.
Spec. 135.

R. Elytra flavous, a short sutural line at the base black.
Spec. 136.

S. Elytra pale flavous, a broad ill-defined medial fascia pale green.
Spec. 137.

T. Elytra fulvous or flavous, immaculate.
a. Elytra not grooved or plicate below the humeral callus.
b. Elytra transversely impressed across the middle.
Spec. 138.

bb. Transverse impression on elytra obsolete.
Spec. 139—145.

aa. Elytra grooved or plicate below the humeral callus.
b. Elytra transversely impressed across the middle.
Spec. 146.

bb. Transverse impression on elytra obsolete.
Spec. 147—153.

U. Elytra prasinous or olivaceous, immaculate.
a. Thorax rufous.
Spec. 154.

aa. Thorax concolorous with the elytra.
Spec. 155—158.

— 41, 64, and 73 vars.

V. Breast densely clothed on the sides with golden hairs; elytra rugose, rufous, the outer limb and apex sometimes narrowly edged with black.
Spec. 159, 160.

Spec. 1. *Diabrotica regalis*, Baly.

Annals & Mag. Nat. Hist., Oct. 1859, p. 270; Journ. Lin. Soc., xix., p. 213; Jac., Biol. Cent. Amer., Coleoptera, vol. vi., pt. 1, p. 502, tab. xxviii., fig. 18.

Var. A. Elytris a basi ad longe pone medium fulvis. Long. 4—5 lin.

Hab. Colombia; Cayenne, type and var. A; also

Central America, Guatemala. My collection, that of the Belgian Museum and Mr. Jacoby.

The broader and more regularly oval form separates this species from any other belonging to the present group.

Spec. 2. *Diabrotica consentanea*, Baly.

Lin. Soc. Journ., xix., p. 214.

Hab. Colombia; also the Upper Amazons and Ecuador. Var. A. My collection.

This insect nearly equals *D. regalis* in size, but is narrower and more elongate. In my former paper I drew up my diagnosis on a specimen in which the two medial spots on the elytron were confluent, forming a transverse band. I have since received other specimens in which the band is divided into two distinct spots, as in *D. regalis;* this is doubtless the normal coloration of the species.

Spec. 3. *Diabrotica gratiosa*, Baly.

Lin. Soc. Journ., xix., p. 215; Jac., Biol., *l. c.*, p. 504, tab. xxviii., fig. 22.

Hab. Colombia, Cauca; also Central America, Nicaragua. Coll. Baly (*type*) and Jacoby.

D. gratiosa closely resembles *elegantula;* the thorax in the present species is convex, the deep fovea on either side being replaced by a small puncture, only visible when viewed sideways under a lens. It is also separated by the rounded, not plicate, sides of the elytra.

Spec. 4. *Diabrotica Lacordairei*, Kirsch.

Berl. Ent. Zeit., 1883, p. 199.

Diabrotica morosa, Jacoby, Biol. C. Amer., pt. vi., p. 503, pl. xxviii., fig. 19.

Ovata, postice ampliata, convexa, flavo-albida aut flava, nitida, pedibus femoribus, ad basin exceptis, pectore, scutello capiteque nigris, antennarum articulis tribus ultimis, ultimi apice excepto, albidis; thorace convexo, lævi; elytris tenuiter punctatis, nigris, utroque maculis subbasalibus duabus, transversim positis, fascia lata vix pone medium, utrinque abbreviata, maculaque subapicali, albidis aut pallide flavis.

Mas. Antennis corpore longioribus, articulis secundo et tertio brevissimis, quarto ad decimum leviter compressis, intus paullo dilatatis; articulo decimo toto nigro.

Fœm. Antennis corpore brevioribus, filiformibus.

Long. 3½ lin.

Hab. Colombia, Bogota; Panama (*Champion*); Upper Amazons (*Garfell*). Dresden Museum (*type*); also coll. Baly and Jacoby.

Head triangular, not longer than broad; clypeus with a distinct longitudinal ridge; antennæ longer than the body in the ♂, the second and third joints very short, the second moniliform, the third turbinate, distinctly shorter than the preceding one, the fourth as long as the basal three united and together with the four following joints, which are each nearly equal in length, more or less distinctly compressed and slightly dilated on their inner edge; antennæ in the ♀ shorter than the body, slender, filiform, the second and third joints rather longer than in the other sex, the third being slightly the longer of the two; black, the three outer joints, the apex of the eleventh excepted, yellowish white. Thorax one-third broader than long; sides parallel and slightly sinuate from the base to beyond the middle, thence slightly rounded and obliquely converging towards the apex; upper surface convex, shining, impunctate. Elytra oblong-ovate, dilated posteriorly; upper surface convex, finely punctured, jet-black, each elytron with three round spots or patches (two half-way between the basal margin and the middle, the inner one large, the outer one smaller and placed close to the lateral margin, the third subapical), and a transverse band just below the middle, abbreviated at either end, white or yellowish white. Legs almost entirely black.

The entirely black legs in both sexes and compressed joints of the antennæ in the male, render this species easy to be recognised. *Diabrotica fraterna*, mihi, with which Mr. Jacoby has confounded this species, is much narrower and quite distinct.

Spec. 5. *Diabrotica guttifera.*

Ent. Month. Mag., xxv., p. 251.

Anguste oblongo-ovata, postice ampliata, flava, nitida, pectore, tibiis, tarsis, scutello capiteque nigris, antennis basi sordide piceis, apice albidis; thorace convexo, lævi; elytris subcrebre subfortiter punctatis; nigris, utroque limbo laterali, postice late abbreviato, maculis duabus infra basin, oblique transversim positis, una sub-

apicali fasciaque prope medium, utrinque abbreviata, albidis aut flavo-albidis.

Var. A. Elytrorum limbo laterali toto nigro, macula subbasali externa obsoleta.

Mas. Antennis corpore longioribus; abdominis segmento anali apice leviter sinuato, disco transversim convexo.

Fœm. Antennis corpore brevioribus.

Long. 3—4 lin.

Hab. Cayenne. My collection.

Head slightly longer than broad in the ♂, as broad as long in the ♀, triangular; clypeus with an ill-defined longitudinal ridge; antennæ filiform, rather longer than the body in the ♂, two-thirds its length in the ♀; the second and third joints short, nearly equal in length in the ♂, the third distinctly longer than the second in the other sex; black, the three lower joints piceous, the three upper ones, the outer half of the apical one excepted, yellowish white. Thorax one-half broader than long; sides nearly parallel and sinuate from the base to beyond the middle, thence rounded and obliquely converging towards the apex; anterior angles thickened, obliquely truncate, the hinder ones subacute; disk smooth, convex. Elytra oblong-ovate, slightly dilated posteriorly, their apices conjointly regularly rounded; above convex, distinctly punctured, the punctures finer below the middle.

Distinctly separated from the preceding species by the narrower form in both sexes, and by the filiform antennæ and sinuate apex of abdomen in the male.

Spec. 6. *Diabrotica alboplagiata*, Jac.

Anguste ovata, postice paullo ampliata, convexa, flava aut flavo-fulva, nitida, tibiis, tarsis, pectore, scutello capiteque nigris, antennarum articulis ultimis tribus, ultimi apice excepto, albidis; thorace convexo, lævi; elytris sat crebre punctatis; nigris, utroque limbo externo, pustulis duabus infra basin, interna magna, rotundata, externa parva, ad limbum adfixa, fascia vix infra medium curvata, utrinque abbreviata, pustulaque ante apicem, rotundata, flavo-albidis aut albidis.

Var. A. Elytrorum limbo albido externo obsoleto. *Diabrotica alboplagiata*, Jac., Cist. Ent., iii., p. 47.

Var. B. Elytrorum maculis inter se plus minusve confluentibus.

Mas. Antennis corpore longioribus; abdominis segmento anali leviter emarginato, disci medio concavo.

Long. 3½—4 lin.

Hab. Amazons (*Bates*); Upper Amazons (*Staudinger*); var. B, Cayenne. Coll. Jacoby (*type*) and Baly.

Head not longer than broad, triangular; clypeus with a distinct longitudinal ridge; antennæ slender, filiform, the second and third joints very short, nearly equal, the fourth much longer than the preceding two united, the three upper joints (the apex of the terminal one excepted) yellowish white, the three or four lower ones in some specimens piceous. Thorax more than one-half broader than long; sides faintly diverging and slightly sinuate from the base to beyond the middle, thence rounded and converging towards the apex, the anterior angles obtuse, the hinder ones subacute; disk transversely convex, smooth, impunctate. Elytra oblong-ovate, dilated posteriorly, regularly rounded at the apices; convex, sometimes faintly impressed below the basilar space, rather closely and distinctly punctured.

The present and preceding species are very closely allied and possibly may prove to be local forms of the same insect; for the present, however, I think it right to consider them distinct.

Spec. 7. *Diabrotica testaceicollis.*

Oblongo-ovata, postice ampliata, convexa, flava, nitida, pectore, tibiis, tarsis, scutello capiteque nigris, antennis ante apicem albidis, basi picea; thorace convexo, rufo-testaceo, elytris tenuiter punctatis, nitidissimis, nigris, utroque maculis parvis tribus, duabus ante medium una ante apicem, lineaque transversa vix pone medium posita, utrinque abbreviata, albidis.

Long. 3 lin.

Hab. Amazons (*Bates*); Peru. My collection.

Antennæ filiform, nearly equal to the body in length, the second joint short, the third slightly longer, the fourth more than equal in length to the preceding two united; black, the four lower joints piceous, the ninth, tenth, and the lower half of the eleventh, white. Thorax nearly one-fourth broader than long; sides slightly sinuate and nearly parallel from the base to the middle, thence obliquely converging towards the apex; convex, nitidous, impressed just in front of the basal margin with a shallow fovea. Elytra ovate, dilated posteriorly, convex, faintly excavated on the suture below the basilar space, the latter obsoletely thickened, surface finely but distinctly punctured; transverse band narrow, margined above and below by a faint sulcation.

The above insect may be known by the entire absence

of the pale outer limb of the elytron, by the smaller size of the spots, and by the margination of the transverse band.

Spec. 8. *Diabrotica Illigeri.*

Ent. Month. Mag., xxv., p. 251.

Anguste ovata, postice paullo ampliata, convexa, flava, nitida, pectore, scutello capiteque nigris, faciei basi plus minusve flava, antennis ad basin piceo-fulvis aut fulvis, articulis penultimis duobus albidis; tibiis, tarsis anoque piceis aut nigro-piceis; thorace convexo, lævi; elytris sat crebre punctatis, nigris, utroque limbo basali, margine externo, maculis duabus infra basin oblique transversim positis, fascia vix pone medium, utrinque abbreviata maculaque subapicali, flavo-albidis.

Var. A. Elytrorum signaturis ampliatis confluentibus, ad basin et ad marginem extensis.

Mas. Antennis corpore paullo longioribus; abdominis segmento anali obtuse rotundato, disco leviter concavo.

Fœm. Antennis corpore vix brevioribus.

Long. 3½ lin.

Hab. Amazons; Para (*Bates*). My collection.

Head not longer than broad, subtrigonate; clypeus with a strongly raised longitudinal ridge; antennæ equal to the body in length in the ♂, rather shorter in the ♀; filiform, the second joint short, submoniliform, the third scarcely longer than the second, obconic, the fourth much longer than the preceding two united; the three lower joints flavous, the ninth and tenth yellowish white, the rest black. Thorax about one-fourth broader than long; sides straight and slightly diverging from the base to beyond the middle, thence slightly converging towards the apex, the hinder and anterior angles subacute; disk convex, nearly impunctate. Elytra oblong, moderately dilated posteriorly, moderately convex, rather closely punctured.

The dark apex of the abdomen separates this species from *albofasciata;* the pale markings on the elytra are also larger and usually confluent.

Spec. 9. *Diabrotica scripta*, Oliv.

Anguste ovata, postice ampliata, convexa, flava aut fulvo-flava, nitida, ano, pectore, tibiis, tarsis, scutello capiteque nigris, antennis ad basin piceo-fulvis, articulis nono et decimo albidis; elytris sat crebre punctatis, nigris, utroque basi extrema, limbo externo, ante apicem abbreviato, maculisque tribus, una inter basin et

medium, rotundata, secunda paullo infra medium, transversa postice leviter emarginata et tertia ante apicem, rotundata, fulvis.

Var. A. Facie inter oculos fulva; elytris nigris, basi extrema, limbo externo, vittis latis discoidalibus duabus plus minusve extensis, maculisque rotundatis una vel duabus, pone medium cum vittis sæpe confluentibus, flavis.

Galleruca scripta, Oliv., Ent., vi., p. 655, tab. 4, fig. 71.

Var. B. Elytris flavis utroque vitta irregulari a vix infra basin fere ad apicem extensa, plerumque ante apicem maculam rotundatam flavam includente, nigra.

Var. C. Elytrorum sutura vittaque submarginali nigris.

Var. D. Elytris flavis, obsolete nigro nebulosis.

Long. 3—3¼ lin.

Hab. Cayenne; Amazons. In most collections.

Head not longer than broad, triangular; clypeus with a broad ill-defined longitudinal ridge; antennæ about three-fourths the length of the body, filiform, the second and third joints short, the third slightly longer than the preceding one; the three lower joints piceo-fulvous, the ninth and tenth white. Thorax about one-half broader than long; sides parallel and slightly sinuate from the base to beyond the middle, thence obliquely converging towards the apex, all the angles very slightly produced, subacute; disk convex, impunctate. Elytra oblong, slightly dilated posteriorly, convex, not depressed below the basilar space, distinctly and rather closely punctured.

Although the specimens that I have described as representing the typical coloration of this species, and those I have placed as varieties, at first sight appear very dissimilar, they do not differ more than the type and varieties of *D. regalis*, *consentanea*, and many others of the present group. All the forms of *D. scripta* agree in the black anal segment of the abdomen and in the coloration of the antennæ, the ninth and tenth joints of these latter alone being white. The type may be known from its allies by the extreme base of the elytra being narrowly edged with fulvous, by the absence of a second subbasal spot (although specimens will possibly be found in which this spot is present), and in the position of the submedial one, which is placed much lower down on the disk than is usually the case in *D. guttata* and other similarly coloured species.

Spec. 10. *Diabrotica Javeti.*

Ent. Month. Mag., xxv., p. 251.

Anguste ovata, postice ampliata, convexa, nigra, nitida, femoribus (apice extremo excepto) thoraceque flavo-fulvis, antennarum articulis novo et decimo flavo-albidis; thorace convexo, obsolete bifoveolato; elytris tenuiter punctatis, utroque maculis duabus rotundatis infra basin, fascia pone medium, utrinque abbreviata maculaque rotundata subapicali, albidis.

Mas. Antennis corpori fere æquilongis, abdominis basi sordide fulva.

Fœm. Antennis corpore brevioribus, abdomine toto nigro.

Long. 3½ lin.

Hab. Brazil, Espirito Sancto; Coll. Fry and Baly. Bahia (*Read*); Coll. Fry.

Head triangular, not longer than broad; clypeus with an elevated ridge; antennæ filiform, nearly equal to the body in length in the ♂, shorter and rather more slender in the ♀; the second and third joints very short, nearly equal and moniliform in the ♂, the fourth nearly twice the length of the two united; in the ♀ the third joint is obconic and very slightly longer than the second, the fourth being about one-half longer than the other two united. Thorax one-half broader than long; sides rounded and slightly produced before the middle, slightly sinuate posteriorly; convex, impressed on either side with a very small shallow fovea. Elytra oblong-ovate, dilated posteriorly, moderately convex, minutely punctured.

The black under side separates *D. Javeti* from the allied species.

Spec. 11. *Diabrotica fulvo-signata*, Baly.

Ann. Mag. Nat. Hist., 5th ser., iii., 1879, p. 77; Jacoby, Biol. Cent. Amer., pt. vi., Col., p. 517, pl. xxix., fig. 12.

Hab. Colombia; also Guatemala, My collection.

Spec. 12. *Diabrotica generosa*, Baly.

L. c., p. 77.

Hab. Ecuador. A single specimen in my own collection.

Spec. 13. *Diabrotica melanocephala* (Fabr).

Entom. Syst. Suppl., 1798, p. 95 (sub *Galleruca*), Oliv., Ent., vi., p. 652, tab. 4, fig. 65.

Galleruca capitata, Fabr., Syst. Gl. i., p. 452.

G. tripunctata, Fabr., *l. c.*, p. 451 ; Oliv., Entom., vi., p. 652, fig. 66 ; Jac., Biol. Cent. Amer., Col., vi., pt. i., p. 516, tab. xxix., fig. 24.

Anguste oblonga, postice paullo ampliata, convexa, flava, nitida, pectore piceo, capite nigro aut piceo, antennis piceis aut fuscis, basi et apice flavis; scutello elytrisque nigro-piceis aut castaneis, utroque limbo externo, apice dilatato, maculisque duabus flavis aut albidis.

Var. A. Elytrorum maculis confluentibus, sæpe ad marginem extensis.

Var. B. Elytrorum macula postica obsoleta.

Var. C. Elytrorum maculis totis obsoletis.

Var. D. Elytrorum sutura, basi plus minusve ampliata, apice abbreviata, vitta irregulari submarginali, a basi fere ad apicem extensa, maculaque parva pone medium, inter vittam et suturam posita, piceis.

Var. E. Elytris macula postica cum sutura et cum vitta submarginali confluente. *Galleruca sinuata*, Oliv., *l. c.*, p. 653, tab. 4, fig. 67 *a*, *b*.

Long. 2½—3 lin.

Hab. West Indian Islands; Trinidad; Nicaragua; Chontales (*Janson*); Cayenne; Amazons, Santarem, Nauta (*Bates*). In most collections.

Head black or rufo-piceous; antennæ filiform, the second and third joints very short, nearly equal in length, the fourth longer than the preceding two united; five or six intermediate joints together with the apex of the terminal one, more or less stained with piceous. Thorax rather broader than long; sides nearly parallel and sinuate from the base to beyond the middle, slightly produced and rounded anteriorly; convex, shining, obsoletely punctured. Elytra oblong, slightly dilated posteriorly; convex, rather closely and distinctly punctured.

This variable species has been described by Fabricius and Olivier under no less than four different names; as, however, I possess a long series of intermediate varieties connecting the extreme forms, I have no hesitation in uniting them under one specific head. Var. D closely resembles in the pattern of its elytra *D. abrupta*,

F., but may be known by the short third joint of the antenna.

Spec. 14. *Diobrotica Pascoei*, Baly.

Ann. Nat. Hist., 5th ser., iii., f. 78.

Hab. Cayenne. My collection.

Separated from *mediofasciata* by its differently-coloured antennæ and larger size.

Spec. 15. *Diabrotica mediofasciata.*

Anguste oblongo-ovata, postice ampliata, convexa, nigra, nitida, pedibus scutello thoraceque fulvis, hoc convexo, lævi; antennis pallide piceis, ante medium pallide flavis; elytris tenuiter sed distincte punctatis; nigris, margine externo ab infra basin ad apicem angusto, apice paullo dilatato, rufo-fulvo, necnon fascia integra lineariformi pone medium posita flava, instructis.

Long. 3 lin.

Hab. Amazons (*Bates*). A single specimen in my cabinet.

Antennæ filiform, nearly equal to the body in length, the second joint short, the third nearly one-half longer than the second, the fourth equal in length to the preceding two united; the six lower joints pale piceous, the rest pale flavous, the apex of the terminal one nigro-piceous. Thorax rather broader than long; sides nearly straight and diverging from the base to the middle, rounded and slightly produced just before the latter, thence converging towards the apex; upper surface convex, smooth, impunctate. Elytra ovate, dilated posteriorly, convex, finely but distinctly punctured; the extreme outer margin from below the shoulder to the apex narrowly edged with rufo-fulvous, the apical margin more broadly bordered with the same colour.

Spec. 16. *Diabrotica bisecta.*

Subelongato-ovata, postice paullo ampliata, convexa, flava, nitida, pectore, pedibus (femoribus ad basin exceptis), scutello capiteque nigris, antennarum articulis penultimis duobus flavo-albidis; thorace transverso, late transversim excavato, obsolete bifoveolato; elytris oblongis, postice vix ampliatis, convexis, ad latera non plicatis; nigris, limbo externo fasciaque mediali flavis.

Mas. Antennis corporis longitudini fere æqualibus, extrorsum distincte incrassatis.

Long. 2¼ lin.

Hab. Amazons, Para. My collection.

Head triangular, not longer than broad; clypeal ridge rather strongly raised, but abbreviated before reaching the anterior margin of the clypeus; antennæ robust, nearly equal to the body in length, the second joint short, the third nearly twice the length of the second, the fourth longer than the preceding two united, the seven upper joints in the ♂ distinctly thickened. Thorax nearly twice as broad as long; sides nearly straight and slightly diverging from the base to the apex; upper surface broadly excavated transversely, the excavated portion faintly impressed on either side with a large shallow fovea. Elytra rather closely punctured, not plicate below the humeral callus.

The excavated thorax at once distinguishes the present species from either of the preceding ones.

Spec. 17. *Diabrotica pectinicornis.*

Ent. Month. Mag., xxv., p. 252.

Elongata, postice paullo ampliata, modice convexa, pallide flava, nitida, tibiis, tarsis capiteque nigris, antennarum articulo penultimo albido, thorace transversim excavato; elytris subcrebre punctatis, nigris, limbo laterali, fascia prope medium apiceque flavis.

Mas. Antennis pectinatis, articulis penultimis duobus incrassatis, difformibus.

Long. 3 lin.

Hab. Colombia; Cauca. A single specimen in my own collection.

Head triangular, not longer than broad, coarsely punctured on the vertex and lower face; clypeus with a distinct longitudinal ridge; antennæ longer than the body in the ♂, the second joint very short, obconic, the third one scarcely half the length of the second, turbinate, the fourth nearly as long as the three basal ones united, the fourth to the eighth each with its upper and inner angle produced upwards and inwards into an acute tooth or process, these teeth increasing in length on each succeeding joint; the ninth and tenth joints strongly thickened, sinuate on their inner margins, the ninth armed at its inner apex with an acute tooth, the tenth bidentate at its inner base, the eleventh joint slender, cylindrical. Thorax nearly twice as broad as long; sides nearly parallel and slightly sinuate from the base to beyond the middle, thence converging towards the apex, the anterior angle distinctly produced, broadly obtuse, the hinder subacute; upper surface transversely excavated on the middle disk, finely but sparingly punctured.

Elytra narrowly oblong, slightly dilated posteriorly, their apices conjointly regularly rounded, convex, slightly flattened along the suture, distinctly and somewhat closely punctured, faintly wrinkled.

Spec. 18. *Diabrotica decaspila.*

Ovata, postice ampliata, convexa, flava, nitida, pectore, femoribus ad apicem, tibiis, tarsis, scutello capiteque nigris, antennarum apice, articuli ultimi apice excepto, albido; thorace lævi; elytris subnitidis, utroque maculis rotundatis quinque, 2, 2, 1 dispositis, flavis; abdominis apice piceo.

Long. 4 lin.

Hab. Cayenne. A single specimen in my own collection.

Head scarcely longer than broad, somewhat wedge-shaped; longitudinal ridge on clypeus well-defined; antennæ filiform, three-fourths the length of the body, the second joint short, the third rather more than one-half longer, the fourth longer than the preceding two united; the three or four basal joints more or less stained with piceous, the three upper ones (the apex of the eleventh excepted) white. Thorax one-half broader than long; sides parallel and distinctly sinuate behind the middle, rounded anteriorly and converging towards the apex, the hinder angle slightly produced; disk convex, smooth, impunctate. Elytra oblong-ovate, dilated posteriorly; convex, impressed below the humeral callus with a short broad longitudinal sulcation, very finely punctured; each elytron with five round flavous spots, placed in pairs, two before, two scarcely behind the middle and one near the apex, rather larger than the rest.

The above species in form and in the disposition of the spots on the elytra resembles *D. regalis;* it is, however, separated by the presence of the longitudinal sulcation below the humeral callus.

Spec. 19. *Diabrotica Jacobyi*, Baly.

Ann. & Mag. Nat. Hist., 5th ser., ii., p. 77, 1879.

Hab. Ecuador (*Buckley*). Unique in my collection.

Spec. 20. *Diabrotica elegantula*, Baly.

Lin. Soc. Journ., xix., p. 213; Jac., Biolog. Cent. Am., *l. c.*, p. 504, pl. xxviii., fig. 21.

Hab. Colombia (Var. A, Magdalena River); also Central America. Coll. Baly (*type*) and Jacoby.

The difference in the relative length of the second and third joints of the antennæ, mentioned by Mr. Jacoby in the 'Biologia,' is sexual; in the ♂ the two joints are of nearly equal length, in the ♀ the third is distinctly longer.

Spec. 21. *Diabrotica adornata.*

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore, tibiis, tarsis capiteque nigris, antennis ad basin piceis, articulis nono decimoque albidis; thorace convexo, tenuiter remote punctato, utrinque obsolete foveolato; elytris subcrebre punctatis, ad latera plicatis; nigris, utroque limbo externo, apice dilatato, macula oblonga aut subrotundata infra basin, fasciaque vix pone medium, fulvis.

Mas. Antennis modice robustis corpori æquilongis, articulis secundo et tertio brevissimis; abdominis segmento anali late truncato.

Fœm. Antennis corpore brevioribus, minus robustis, articulo tertio secundo longiori.

Long. 2½—3 lin.

Hab. Cayenne. My collection.

Head not longer than broad; clypeus with a slightly elevated, longitudinal ridge; antennæ robust, equal to the body in length in the ♂, rather shorter in the ♀, filiform, the second and third joints short, equal and submoniliform in the ♂; in the ♀ the second joint is short, subovate, whilst the third is one-half longer, the fourth in both sexes is longer than the preceding two united; the four lower joints pale piceous, the ninth and tenth yellowish white. Thorax about one-fourth broader than long; sides nearly parallel and slightly sinuate from the base to beyond the middle, thence obliquely converging towards the apex; the hinder and anterior angles subacute; above convex, obsoletely foveolate on either side, shining, impunctate. Elytra oblong, slightly dilated posteriorly, convex, very minutely punctured.

Spec. 22. *Diabrotica viridimaculata*, Jacoby.

Proc. Zool. Soc., 1878, p. 150.

Anguste ovata, postice ampliata, convexa, prasina, nitida, pectore, tibiis, tarsis, scutello capiteque nigris, antennis ad basin piceis, ad apicem albidis; thorace leviter trifoveolato, fovea tertia minus distincta, interdum obsoleta; elytris distincte punctatis, infra callum humeralem leviter plicatis; nigris, utroque limbo externo, apice dilatato, maculis duabus, una rotundata subbasali, altera apicali ad

marginem adfixa fasciaque angusta vix pone medium posita, ad suturam abbreviata, prasinis.

Long. 3 lin.

Hab. Cayenne. Coll. Jacoby (*type*) and Baly.

Head triangular; antennæ slender, filiform, the second joint short, the third nearly twice its length, the fourth as long as the preceding two united, the four lower joints flavo-piceous, the three upper ones white, the rest black. Thorax about one-fourth broader than long; sides parallel and slightly sinuate from the base to beyond the middle, thence slightly rounded and converging towards the apex; upper surface shining, disk impressed on either side with a very shallow fovea.* Elytra distinctly and rather closely punctured, plicate below the humeral callus.

Spec. 23. *Diabrotica viridi-pustulata*, Baly.

Journ. Lin. Soc., xix., p. 226, 1886.

Hab. Colombia. Coll. Oberthür (*type*).

Spec. 24. *Diabrotica Chapuisi*, Baly.

L. c., p. 227.

Hab. Colombia. Coll. Oberthür (*type*).

Spec. 25. *Diabrotica Ianthe.*

Elongata, postice leviter ampliata, convexa, flava, nitida, pectore, tibiis, tarsis, scutello capiteque nigris, antennarum apice albido; thorace trifoveolato, foveis transversim positis; elytris distincte, sat crebre punctatis; læte cyaneis, limbo externo, apice ampliato, fasciaque communi vix pone medium posita, extrorsum abbreviata, flavis.

Long. 4 lin.

Hab. Ecuador (*Buckley*). My collection; a single specimen.

Head not longer than broad; clypeal ridge raised, ill-defined on the sides; antennæ filiform, nearly three-fourths the length of the body, the second joint short, the third slightly longer, the fourth longer than the preceding two united; black, the three outer joints, the extreme apex of the terminal one excepted, yellowish white. Thorax one-third broader than long; sides rounded anteriorly,

* Mr. Jacoby, in his diagnosis, mentions a third fovea less distinctly impressed; this is obsolete in the specimen given me by him.

sinuate behind the middle, upper surface moderately convex, impressed with three shallow foveæ, placed transversely across the disk. Elytra subelongate, slightly dilated posteriorly, convex, slightly plicate below the humeral callus, distinctly and rather closely punctured.

The above insect, of which I only know a single specimen, somewhat resembles in coloration *D. elegans*.

Spec. 26. *Diabrotica octo-pustulata.*

Subelongato-oblonga, postice paullo ampliata, convexa, flava, viridi tincta, nitida, scutello, thorace capiteque prasinis, antennis piceis aut nigro-piceis articulis subapicalibus duobus albidis; thorace longitudine paullo latiori, convexo; elytris sat crebre punctatis, castaneis, limbo externo prasino; utroque pustulis quatuor, longitudinaliter positis albido-flavis.

Var. A. Elytris viridi-flavis, utroque vitta lata discoidali castanea. *Diabrotica latevittata*, Baly, Trans. Ent. Soc. Lond., 1886, p. 444.

Long. 3 lin.

Hab. Upper Amazons (*Garfell*). My collection.

Antennæ filiform, equal to the body in length, the second and third joints very short, nearly equal, the fourth nearly equal in length to the three lower ones united; piceous or nigro-piceous, the three basal joints paler than the rest, the ninth and tenth white. Thorax rather broader than long; sides sinuate and nearly parallel from the base to beyond the middle, thence obliquely converging to the apex; above convex, sparingly impressed with very minute punctures. Elytra oblong, slightly dilated posteriorly, convex, rather closely and distinctly punctured; castaneous, the outer limb broadly edged with pale grassy green; each elytron with four large round pale yellow pustules, placed longitudinally on the inner disk, one at the base, one before the middle, a third below the latter, lastly one subapical and confluent with the outer limb.

This species was originally described by me in 1886; the name then given (*latevittata*) does not apply to the ordinary pattern of the elytra. I have therefore changed it to the one given above.

Spec. 27. *Diabrotica rugulipennis.*

Subelongato-ovata, postice ampliata, convexa, flava, nitida, thorace rufo, pectore, pedibus, scutello capiteque nigris, antennis

ad basin piceis, apice albidis ; thorace sat fortiter bifoveolato ; elytris rugulosis, cyaneis, limbo externo, apice ampliato, lævi, flavo.

Long. 3½ lin.

Hab. Colombia ; Magdalena River. Unique in my collection.

Head not longer than broad; ridge on clypeus ill-defined; antennæ filiform, equal to the body in length, the second joint short, the third one-half longer, the fourth longer than the preceding two united, the three or four lower joints more or less piceous, the three upper ones yellowish white. Thorax slightly longer than broad ; sides nearly parallel and faintly sinuate, slightly converging in front, the hinder angles somewhat produced, subacute ; upper surface nitidous, hinder disk excavated and impressed on either side with a large deep fovea. Elytra narrowly oblong, slightly dilated posteriorly, moderately convex, distinctly and rather closely punctured, disk irregularly wrinkled, rugulose, plicate below the humeral callus, the subhumeral costa extending downwards below the middle, not strongly defined, but bounded within by a broad longitudinal sulcation ; metallic-blue, the outer limb, dilated at the apex, flavous, its surface smoother than that of the disk.

Spec. 28. *Diabrotica Fowleri.*

Anguste elongata, fere parallela, modice convexa, nigra, nitida, femoribus ad apicem exceptis, antennarumque articulo penultimo (*ultimo fracto*) albidis, thorace leviter bifoveolato, nigro-piceo, utrinque vitta lata albida ; elytris parallelis, distincte punctatis, utroque vitta lata, a basi fere ad apicem extensa, albida.

Long. 3 lin.

Hab. Brazil, New Friburg. My collection. Rio Janeiro ; coll. Fry.

Head triangular, not longer than broad ; clypeal ridge ill-defined ; antennæ filiform, rather shorter than the body, the second joint short, obovate, the third rather longer than the second, the fourth one-half longer than the preceding two united. Thorax rather broader than long ; sides parallel and faintly sinuate from the base to beyond the middle, thence slightly converging towards the apex ; disk nitidous, impunctate, impressed on either side with a large shallow fovea. Elytra parallel, moderately convex, plicate below the humeral callus, distinctly punctured.

Spec. 29. *Diabrotica bilineata.*

Anguste elongata, fere parallela, modice convexa, nigra, nitida, antennarum articulis penultimis duobus albidis ; thorace trifoveo-

lato; elytris parallelis, ad latera plicatis, utroque vitta lata discoidali, a basi fere ad apicem extensa alba.

Mas. Antennis corpore paullo longioribus filiformibus.

Fœm. Antennis corpore brevioribus robustis.

Long. 2—2¼ lin.

Hab. Brazil, New Friburg, ♂. My collection; Rio Janeiro, ♂ and ♀, coll. Fry.

Head not longer than broad; clypeal ridge rather strongly raised, well-defined; eyes in the ♂ large, prominent; antennæ filiform and slightly longer than the body in the ♂, the second and third joints in the same sex very short, moniliform, the fourth equal in length to the preceding three united; antennæ in the ♀ shorter than the body, more robust than in the ♂, the third joint slightly longer than the second, the fourth shorter than the preceding three united. Thorax nearly one-fourth broader than long; sides straight from the base to beyond the middle, very slightly diverging in the ♂, parallel in the other sex, thence obliquely converging towards the apex; disk trifoveolate, the third fovea less deeply impressed than the other two. Elytra elongate, parallel, strongly plicate below the humeral callus, minutely punctured.

Very similar in form to *Diabrotica Fowleri*; separated by the trifoveolate thorax.

Spec. 30. *Diabrotica chloropus*, Harold.

Ent., Hefte xiii., 1875, p. 90.

Anguste elongata, postice vix ampliata, convexa, nigra, nitida, antennarum articulis ultimis duobus, ultimi apice excepto, albidis, femoribus flavis, thorace trifoveolato, fovea posteriori minus distincta; elytris ad latera plicatis, utroque vitta lata discoidali, a basi ad longe pone medium extensa maculaque subapicali, testaceis aut flavis.

Long. 3 lin.

Hab. Brazil, Minas Gereas, St. Catharine (*Harold*); Rio Janeiro (*Fry*); Coll. Fry and Baly.

Head triangular, not longer than broad; eyes large, prominent; clypeal ridge well-defined; antennæ equal to the body in length, filiform, the second and third joints short, nearly equal, the fourth longer than the preceding two united, black, the tenth and eleventh, the apex of the latter excepted, white. Thorax slightly longer than broad; sides parallel, slightly produced and rounded anteriorly, the anterior angle obliquely truncate; disk trifoveolate, the

hinder fovea ill-defined. Elytra minutely punctured, strongly plicate below the humeral callus.

H. von Harold describes the thorax as being bifoveolate; the third fovea is less distinctly impressed and probably in some specimens entirely obsolete.

Spec. 31. *Diabrotica exclamationis*, Baly.

Ann. & Mag. Nat. Hist., 1859, p. 271.

Hab. Brazil. Unique in my own collection.

The present species differs from the preceding in its non-foveolate thorax and in the entirely black legs and antennæ.

Spec. 32. *Diabrotica Donckieri.*

Ent. Month. Mag., xxv., p. 252.

Anguste oblonga, postice paullo ampliata, convexa, nigra, nitida, femorum basi flava; facie thoraceque fulvis, hoc bifoveolato, disco plagis duabus ornato; elytris distincte, minus crebre punctatis, punctis infra basin subseriatim dispositis; nigris, utroque limbo externo, linea suturali, ab apice ad paullo ante medium extensa, hinc ad basin oblique excurrenti, limbo externo fasciisque lineariformibus duabus, una longe ante, altera vix infra medium positis, flavo-albidis.

Long. 3 lin.

Hab. Brazil, Rio Janeiro (*Fry*). Coll. Fry and Baly.

Head not broader than long, subrotundate; clypeus with the longitudinal ridge distinct, but not strongly elevated; antennæ three-fourths the length of the body, black, the second joint short; the third distinctly longer than the second, the fourth as long as the preceding two united. Thorax one-half broader than long; sides subangulate just behind the middle, faintly sinuate posteriorly, slightly converging towards the apex in front; above convex, deeply impressed on either side with a large round fovea; disk with two large black patches, which are confluent on the medial line. Elytra oblong, slightly dilated posteriorly, their apices regularly rounded; above convex, distinctly punctured, the punctures on the anterior disk obsoletely arranged in striæ; subhumeral callus very slightly raised, ill-defined; each elytron with the narrow outer limb, a sutural line, which, extending from the apical angle to a short distance above the middle of the elytron, from thence runs obliquely outwards to the basal margin just within the humeral callus, yellowish white; in addition are two

linear concolorous fasciæ, one extending from the outer margin to the anterior oblique line, the other, placed just below the middle, extending from the suture to the outer limb.

Spec. 33. *Diabrotica tarsalis*, Harold.

Ent., Hefte xiii., 1875, p. 92.

Ovata, postice ampliata, nigra, nitida, thoracis limbo elytrorumque limbo externo, sutura, antice abbreviata lineisque transversis vel maculis irregularibus, flavis.

Var. A. Elytris flavis, maculis irregularibus nigris.

Long. 2 lin.

Hab. Colombia, Bogota, Magdalena River. My collection.

Head triangular, not longer than broad; longitudinal ridge on clypeus ill-defined; antennæ filiform, three-fourths of the body in length, the second joint short, the third nearly one-half longer, the fourth longer than the preceding two united, two or three of the basal joints piceous beneath, the rest entirely black. Thorax nearly two-thirds broader than long; sides moderately rounded, nearly straight and parallel posteriorly; disk convex, obsoletely foveolate on either side. Elytra rather broadly ovate, slightly dilated posteriorly, convex, disk impressed with faint longitudinal sulcations.

The present insect varies greatly in coloration; in the typical form the elytra are black, with the sutural and outer margins, together with several obliquely transverse lines on the disk, flavous; in some specimens the black colour gradually disappears until they may be described as flavous, with irregular black markings.

Spec. 34. *Diabrotica distincta.* Jacoby.

Cist. Ent., iii., p. 46.

Subelongato-ovata, postice paullo ampliata, convexa, flava aut viridi-flava, nitida, pectore pedibusque, femoribus exceptis, nigro-piceis, scutello capiteque nigris, antennis piceis, ad basin pallidis, ante apicem sordide albidis; thorace lævi; elytris tenuissime punctatis, ad latera non plicatis, utroque linea suturali, plaga oblonga a basi ad ultra medium extensa, intus angulatim emarginata alteraque transversa pone medium, piceis aut nigro-piceis.

Long. 2 lin.

Hab. Amazons (*Bates*). Coll. Jacoby (*type*) and Baly.

Head not longer than broad; clypeal ridge rather strongly raised, well-defined; antennæ filiform, nearly equal to the body

in length, the second and third joints short, nearly equal, the fourth much longer than the preceding two united, the three or four lower joints pale piceo-flavous, the three upper ones, the apex of the eleventh excepted, yellowish white. Thorax broader than long; sides rounded anteriorly, nearly parallel and sinuate posteriorly; disk convex, impunctate. Elytra oblong, dilated posteriorly, convex, not plicate below the humeral callus, very finely punctured.

Spec. 35. *Diabrotica atromaculata.*

Proc. Zool. Soc., 1889, p. 94.

Anguste, oblonga-ovata, convexa, flava, nitida, pectore, scutello capiteque nigris, antennis flavis, articulis intermediis piceis, thorace lævi; elytris crebre punctatis, utroque macula basali communi, plaga magna humerali trigonata, intus profunde excavata fasciaque pone medium, utrinque abbreviata, postice emarginata, nigris.

Var. A. Elytrorum fascia post-mediali interrupta, maculas duas formanti.

Long. $2\frac{2}{3}$ lin.

Hab. Amazons, Santarem (*Bates*). My collection.

Antennæ filiform, the second joint short, the third about one-half longer than the second, the fourth slightly longer than the preceding two united; the six or seven intermediate joints more or less stained with piceous. Thorax slightly broader than long; sides rather deeply sinuate from the base to the middle, slightly dilated at the latter, thence converging towards the apex; disk convex, shining, impunctate. Elytra dilated posteriorly, convex, slightly excavated on the suture below the scutellum, closely and rather strongly punctured; each elytron with three black patches, one at the base common, pentangular, one on the humeral callus large, triangular, extending downwards from immediately below the basal margin to the middle of the elytron, its inner surface deeply emarginate, lastly, one below the middle, transverse, abbreviated at the suture and outer limb, its hinder margin emarginate, black.

Rather larger than *D. distincta;* the markings on the elytra, which sometimes change to dark piceous, are more irregular than in that species; there is also an additional patch placed on the suture at its base.

36. *Diabrotica piceo-picta.*

Anguste oblonga, postice vix ampliata, pallide flava aut prasina, nitida, tarsis, capitis vertice, antennis scutelloque pallide piceis; his ad basin et ad apicem piceo-flavis; thorace bifoveolato; elytris crebre punctatis, ad latera plicatis, utroque maculis quatuor, inter se plerumque confluentibus, duabus basalibus, prima communi cuneiformi, secunda humerali, una prope medium transversa, unaque inter medium et apicem bruneis aut castaneis.

Long. 2—2½ lin.

Hab. Upper Amazons (*Garfell*). My collection.

Head scarcely broader than long; longitudinal ridge on clypeus well-defined; labrum and eyes black; antennæ filiform, equal to the body in length in the ♂, slightly shorter in the ♀, the second and third joints very short, equal in length in the ♂, the third nearly one-half longer in the ♀; pale piceous, the two lower joints, together with the tenth and eleventh, the extreme apex of the latter excepted, piceo-flavous (in some specimens these two are not paler than the preceding ones). Thorax slightly broader than long; sides rounded anteriorly, distinctly sinuate and slightly converging behind the middle; disk shining, impunctate, impressed on either side with a shallow fovea, which varies in depth in different individuals. Elytra oblong, slightly dilated posteriorly, convex, rather closely punctured, plicate below the humeral callus, the subhumeral ridge bounded within by a broad sulcation, which varies in depth and in some cases is almost entirely obsolete; in the more strongly-marked specimens there are traces in addition of several shallow sulcations on the disk.

This insect closely resembles *D. atromaculata* in the pattern of its elytra, but is separated by the paler head, foveolate thorax and plicate sides of the elytra.

Spec. 37. *Diabrotica atomaria*, Jacoby.

Proc. Zool. Soc., 1889, p. 284.

Anguste ovata, postice ampliata, convexa, fulvo-flava, nitida, pectore, scutello capiteque nigris, antennis pallide fuscis ad basin et ante apicem flavis; tibiarum anticorum dorso tarsisque nigro-piceis; thorace convexo, non foveolato; elytris crebre distincte punctatis; flavis, utroque suturæ basi, macula humerali, una mediali duabusque pone medium, his transversim positis, nigris.

Long. 2 lin.

Hab. Colombia, Caracas. Coll. Simon and Jacoby.

Head not longer than broad; clypeal ridge prominent, entire; antennæ nearly equal to the body in length, filiform, the second and third joints short, equal, the fourth much longer than the preceding two united; fuscous, the three lower joints, together with the ninth and tenth, flavous. Thorax nearly one-half broader than long; sides slightly produced and rounded anteriorly, nearly straight and parallel behind the middle; disk convex, not foveolate. Elytra oblong-ovate, convex, closely punctured; flavous, each elytron with a narrow sutural line, dilated at the base and extending downwards slightly below the middle, a subtriangular basal patch covering the humeral callus, a subrotundate spot on the outer disk at its middle and two smaller spots placed transversely on the hinder disk, half-way between the middle and apex, black; the basal margin between the humeral patch and the suture also narrowly edged with black; the lower and inner angle of the basal patch is joined to the suture by a narrow piceous line.

The specimen of this species, kindly lent me by Mr. Jacoby, and from which the above description was drawn, differs slightly in the coloration of its antennæ and legs from the diagnosis given in that author's paper; it is however, probably somewhat variable in colour.

Spec. 38. *Diabrotica confluenta.*

Ovata, postice ampliata, convexa, nigra, nitida, abdomine, disci medio excepto, thoraceque fulvis, hoc convexo, obsolete bifoveolato; elytris distincte, sat crebre punctatis, ad latera obsolete plicatis; flavis, utroque vitta communi basali, vitta brevi humerali maculisque irregularibus discoidalibus, his maculis inter se et cum vittis basalibus confluentibus, nigris.

Long. 3 lin.

Hab. Ecuador (*Buckley*). A single specimen in Mr. Fry's collection.

Head not longer than broad, entirely black; antennæ filiform, equal to the body in length, the second joint short, the third half as long again as the second, the fourth longer than the preceding two united. Thorax nearly one-half broader than long; sides faintly sinuate from the base to just beyond the middle, thence rounded and converging towards the apex; disk convex, nitidous, impressed on either side with a small shallow fovea. Elytra broadly ovate, dilated posteriorly, convex, distinctly and rather closely punctured; flavous, some irregular patches on the middle disk, confluent with each other and also with the sutural and humeral vittæ, black; the apical third of the disk immaculate.

Spec. 39. *Diabrotica vagrans.*

Proc. Zool. Soc., 1889, p. 94.

Anguste ovata, postice ampliata, convexa, nigra, nitida, abdomine thoraceque flavis, hoc convexo lævi; elytris crebre punctatis, flavis, suturæ basi vittisque vel vittulis irregularibus nigris.

Long. $2\frac{1}{2}$ lin.

Hab. Bolivia. My collection.

Head triangular, not longer than broad; clypeus with an elevated ridge; antennæ filiform, the second and third joints short, equal, submoniliform, the fourth longer than the preceding two united. Thorax about one-fourth broader than long; sides straight and parallel from the base to beyond the middle, thence obliquely converging and slightly rounded towards the apex; upper surface transversely convex, smooth, impunctate. Elytra oblong-ovate, scarcely dilated posteriorly, their apices regularly rounded, convex, strongly and rather closely punctured; flavous, each elytron with the suture at its base, a short irregular patch, placed on the central third of the middle disk, often connected obliquely with the sutural marking and an irregular submarginal vitta extending from the base nearly to the apex of the elytron, black; this vitta is frequently interrupted, forming two or more longitudinal spots.

Spec. 40. *Diabrotica pauperata.*

Late ovata, postice ampliata, valide convexa, flava, nitida, pectore, scutello capiteque nigris, antennis ad apicem albidis ad basin fulvis; thorace convexo, lævi; elytris crebre punctatis, utroque suturæ basi, vitta humerali longe ante apicem abbreviata et pone medium interrupta punctisque duobus discoidalibus, uno prope medium, altero inter medium et apicem positis, nigris.

Var. A. Elytri vitta humerali ramulam transversam ad punctum primum emittenti.

Var. B. Elytrorum signaturis nigris plus minusve obsoletis.

Long. 3 lin.

Hab. Bahia (*Reed*). Type in coll. Fry and Baly. Vars. A and B in coll. Fry.

Head not longer than broad, triangular; clypeus with a broad ill-defined longitudinal ridge; antennæ filiform, rather more than half the length of the body; the second joint short, the third nearly twice as long, the fourth equal in length to the preceding two united; the three lower joints piceous, the three upper ones

white, the rest black. Thorax about one-half broader than long; sides slightly diverging and faintly sinuate from the base to the middle, thence rounded and converging towards the apex; disk convex, smooth, impunctate. Elytra subquadrate, ovate, broadly dilated posteriorly, their apices broadly rounded; upper surface strongly convex, faintly excavated transversely below the basilar space, rather coarsely and somewhat closely punctured.

Spec. 41. *Diabrotica decempunctata*, Latr.

Latr., Voy. Humb., ii, 1833, p. 21, tab. 39, fig. 9.

Var. A. Elytris immaculatis. *Diabrotica placida*, Baly, Journ. Lin. Soc., xix., 1886, p. 220.

Hab. Colombia. In most collections.

Since the description was published I have come to the conclusion that *D. placida*, mihi, cannot be separated from *D. 10-punctata*.

Spec. 42. *Diabrotica centralis*, Jac.

Cist. Ent, iii., p. 46.

Diabrotica histrionica, Baly, Journ. Lin. Soc., xix., p. 215.

Hab. Colombia, Venezuela. Coll. Jacoby and Baly.

When describing the present insect I overlooked Mr. Jacoby's diagnosis.

Spec. 43. *Diabrotica spilota*, Baly.

L. c., p. 216.

Hab. Columbia. My collection.

Spec. 44. *Diabrotica Klugii*, Baly.

L. c., p. 258.

Hab. Colombia. My collection.

Spec. 45. *Diabrotica duplicata*, Jacoby.

Biol. Cent. Amer. Coleopt., pt. i., p, 519, tab. xxx., fig. 7.

Subelongata, postice paullo ampliata, convexa, flava aut fulvo-flava, nitida, pectore capiteque nigris, vertice interdum nigro-piceo, antennis fusco-fulvis ad apicem pallidioribus; thorace lævi, disco

excavato, leviter trifoveolato, fovea tertia minus distincta, interdum obsoleta; elytris tenuiter punctatis, ad latera plicatis, flavis apice rufo-fulvo, utroque maculis quinque 1, 2, 2, nigris, interdum cyaneo tinctis.

Long. $2\frac{1}{2}$—3 lin.

Hab. Colombia; also Central America. Coll. Jacoby and Baly.

Very similar to *D. spilota*, mihi; separated by the more deeply excavated thorax, by the paler antennæ and by the absence of the sutural black patch of the elytra.

Spec. 46. *Diabrotica quindecimpunctata*, Germar.

Spec. Ins., p. 600 (1824).

Diabrotica nigro-notata, Baly, Journ. Lin. Soc., xix., p. 216.

Hab. Brazil, Petropolis (*Gray*); Tejuca (*Clark*); Colombia. In most collections.

After a careful comparison of Brazilian and Colombian specimens, I have discovered that they all belong to a single species, *15-punctata*, Ger.

Spec. 47. *Diabrotica Germari.*

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore, unguibus, scutello capiteque nigris, antennis ad basin piceo-flavis ad apicem albidis, thorace leviter bifoveolato; elytris crebre, sat fortiter punctatis, utroque maculis sex, duabus basalibus, una suturali, communi, altera humerali, necnon duabus ante duabusque pone medium, transversim positis, nigris.

Long. 4 lin.

Hab. Colombia, Cauca. My collection.

Head rather longer than broad; clypeal ridge raised; antennæ slender, filiform, equal to the body in length, the second and third joints very short, nearly equal, the fourth longer than the preceding two united, the four lower joints piceo-flavous, the four upper ones white, more or less stained with fuscous, the rest black. Thorax nearly one-half broader than long; sides straight and parallel from the base to beyond the middle, thence rounded and converging towards the apex; upper surface smooth, disk impressed on either side with a small shallow fovea. Elytra narrowly oblong, dilated posteriorly, convex, coarsely and rather closely punctured.

Very similarly coloured to *D. 15-punctata;* separated by its narrow form, bifoveolate thorax and coarsely punctured elytra.

Spec. 48. *Diabrotica Sharpii*, Kirsch.

Berliner Entom. Zeitschrift, xxvii., 1883, Heft ii., p. 201.

Late ovata, postice ampliata, valde convexa, flava, nitida, tibiis, tarsis, pectore, scutello capiteque nigris, antennis ad basin piceis, articulis penultimis duobus ultimique basi albidis; thorace convexo, lævi; elytris subnitidis, obsolete rugulosis, crebre punctatis; sordide rufo-testaceis, limbo externo, apice late ampliato, flavo; utroque suturæ basi maculaque humerali nigris.

Long. 3 lin.

Hab. Bolivia, Dresden Museum (*type*); Ecuador (*Buckley*). Coll. Fry and Baly.

Head triangular, not longer than broad; clypeus with a longitudinal ridge; antennæ filiform, nearly equal to the body in length, the second joint short, submoniliform, the third more than one-half longer, the fourth equal in length to the preceding two united; black, the four or five lower joints piceous, the ninth, tenth, and basal half of the eleventh, white. Thorax about one-half broader than long; sides slightly sinuate behind the middle, thence rounded and converging towards the apex; upper surface convex, shining, impunctate. Elytra broadly ovate, dilated towards the apex; upper surface strongly convex, closely punctured, faintly rugulose.

Similar in shape to *D. 15-punctata* and *pauperata*. All the specimens that I have seen agree very closely with each other, and differing from the preceding species in coloration.

Spec. 49. *Diabrotica biannularis*, Harold.

Col., Heft xiii., p. 91 (1875).

Diabrotica nummularis?, Harold, Mitth. Munch. Ent. Ver., 1877, p. 111.

Anguste oblongo-ovata, postice paullo ampliata, convexa, flava, nitida, post-pectore capiteque nigris, antennis flavis, articulis intermediis nigro-piceis aut nigris; thorace lævi, disci medio leviter excavato aut deplanato, leviter trifoveolato; elytris tenuiter punctatis; utroque annulis duobus, uno infra basin altero pone medium, hoc sæpe aperto, nigro-cæruleis.

Var. A. Antennis flavis, cæteris ut in typo.

Var. B. Elytro utroque plagis magnis duabus, una basali, communi, utrinque punctum parvum flavum plerumque includenti alteraque pone medium, postice plerumque emarginata, nigro-cæruleis.

Var. C. Elytrorum annulo basali, postice interrupto vittulisque duabus pone medium transversim positis, nigro-cæruleis.

Long. 3 lin.

Hab. Colombia (*type*); two specimens in my own collection. Central America (*type and varieties*). In most collections.

Head shining black; longitudinal ridge on clypeus well-defined; antennæ filiform, the third joint distinctly longer than the second, the fourth longer than the preceding two united. Thorax nearly one-fourth broader than long; sides diverging and sinuate from the base to the middle, slightly produced and rounded anteriorly, thence slightly converging towards the apex; upper surface smooth, impunctate, hinder disk flattened or slightly excavated, impressed with three shallow foveæ, one on either side about the middle, the third less distinctly defined than the others and often obsolete, placed immediately in front of the basal margin. Elytra oblong, slightly dilated posteriorly, minutely punctured.

The present species is so closely similar in colour and variation of pattern to *D. pulchella* and *adelpha*, Harold, that without close attention to the sculpturing of the thorax it is quite impossible to separate them. In *C. biannularis* the hinder portion of the middle disk is more or less distinctly excavated, the excavated surface being impressed with three shallow foveæ, placed in a triangle, the hinder one sometimes obsolete; this excavation varies greatly in depth, and in some few cases almost entirely disappears, in some specimens the hinder disk being simply flattened, but never, in any of the specimens that I have examined, convex; in the two allied species the disk is regularly convex, its surface being bifoveolate in *C. pulchella*, whilst in *C. adelpha* the foveæ are obsolete.

Spec. 50. *Diabrotica pulchella*, Jacq. Duval.

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore capiteque, antennis ad basin et ad apicem exceptis, nigris; thorace bifoveolato; elytris tenuissime punctatis, utroque annulo basali alteroque pone medium, hoc plerumque lacerato, cyaneis.

Var. A. Elytro utroque plaga magna basali communi, plerumque maculam parvam flavam includenti, alteraque pone medium, cyaneis.

Phyllobrotica pulchella, Jacq., Duval, Hist. Nat. de Cuba, p. 307, pl. 7, fig. 8.

Diabrotica pulchella, Suffr., Wieg. Archiv., 1867, p. 308.

Long. 3 lin.

Hab. Ecuador (*Buckley*). A single specimen in the collection of Mr. Fry. Also Mexico and other parts of Central America, where it appears to be common. In most collections.

This insect is so closely allied to *D. biannularis*, Harold, that it is quite unnecessary to give a detailed description; the sole point of difference between the two being that in *pulchella* the thorax is convex and bifoveolate, whilst in *biannularis* it is more or less distinctly excavated and trifoveolate.

Spec. 51. *Diabrotica inæqualis*, Baly.

Journ. Lin. Soc., xix., p. 219 (1886).

Hab. Colombia, Magdalena River. My collection.

Closely allied to *biannularis*, agreeing in the sculpturing of the thorax, but separated by its larger size, the irregular and coarser punctuation of its elytra, the plicate outer disk, the black tibiæ and tarsi and the darker coloration of the antennæ.

Spec. 52. *Diabrotica Haroldi*, Baly.

L. c., xix., p. 219.

Hab. Colombia. Unique in my own cabinet.

Agreeing in size and in the coloration of its legs and antennæ with the preceding species, differing in the smoother surface of the elytra and in the bi- not trifoveolate thorax.

Spec. 53. *Diabrotica varicornis*, Jacoby.

Proc. Zool. Soc., 1889, p. 282.

Subelongata, postice paullo ampliata, convexa, fulva nitida, pectore labro antennarumque articulis intermediis nigris; thorace

bifoveolato; elytris crebre punctatis, utroque annulo basali lineaque semilunata pone medium, nigris cæruleo vix tinctis.

Long. 3 lin.

Hab. Colombia, San Esteban. Coll. Jacoby.

Head triangular, not longer than broad, rufo-fulvous, the labrum and eyes black; clypeal ridge nearly obsolete; antennæ filiform, more than four-fifths the length of the body, the second joint short, the third nearly one-half longer, the fourth slightly longer than the preceding two united; the third to the ninth black, the rest fulvous. Thorax one-third broader than long; sides slightly produced and rounded just before the middle, rather deeply sinuate behind the latter, obliquely converging and slightly rounded in front; disk nitidous, deeply bifoveolate. Elytra closely and rather strongly punctured, faintly wrinkled on the middle disk; each with a large annulus at the base and a semilunate fascia below the middle, black with a faint metallic-blue tinge.

Spec. 54. *Diabrotica Reedii.*

Ovata, postice ampliata, convexa, flava, nitida, pectore, scutello capiteque nigris, antennis ad basin piceis, articulis ultimis tribus, ultimi apice excepto, albidis; thorace convexo, rufo-testaceo; elytris distincte, subcrebre punctatis, fascia lata communi baseos, ad marginem abbreviata, et utroque maculis transversis duabus, una vix ante medium, altera inter medium et apicem positis, nigris.

Var. A. Elytrorum macula antica cum fascia basali confluenti.

Long. 3—3½ lin.

Hab. Bahia (*Reed*). Coll. Fry and Baly.

Head triangular, not longer than broad; clypeus with a broad longitudinal ridge; antennæ filiform, robust and slightly exceeding the body in length in the ♂, more slender and slightly shorter in the ♀; the second and third joints in the ♂ very short, equal, the third joint in the ♀ slightly longer than the second, the fourth in both sexes longer than the preceding two united: the three or four lower joints piceous, the three upper ones, the upper portion of the apical one excepted, white. Thorax nearly one-half broader than long; sides slightly produced and rounded anteriorly, sinuate behind the middle, convex, impressed but not closely, with fine punctures. Elytra broadly ovate, dilated posteriorly, their apices regularly rounded; convex, transversely depressed below the basilar space, distinctly punctured.

Spec. 55. *Diabrotica transversa.*

Ovata, postice ampliata, sat valde convexa, flava, nitida, pectore, scutello capiteque nigris, antennis ad basin pallidis, ad apicem albidis, tibiis tarsisque pallide piceis; thorace convexo, integro; elytris flavis, plaga magna basali ad marginem lateralem abbreviata, fasciaque lata pone medium, extrorsum abbreviata, nigris.

Long. 3½ lin.

Hab. Brazil, St. Catharine; my collection.

Head not longer than broad; longitudinal ridge on clypeus strongly raised; antennæ filiform, nearly five-sixths the length of the body, second and third joints short, the third rather longer than the second, the fourth longer than the preceding two united; the three lower joints piceous or nigro-piceous, the three upper ones, the extreme apex of the eleventh excepted, white. Thorax one-half broader than long; sides nearly straight and parallel from the base to beyond the middle; disk convex, its surface entire. Elytra broadly ovate, dilated posteriorly, rather strongly convex, slightly depressed transversely below the basilar space, minutely punctured.

Broader than the preceding species; otherwise closely allied.

Spec. 56. *Diabrotica speciossima*, Baly.

Ann. & Mag. Nat. Hist., 5th ser., iii., p. 79.

Hab. Ecuador. My collection.

Spec. 57. *Diabrotica elegans*, Baly.

L. c., p. 80.

Hab. Ecuador. In most collections.

Spec. 58. *Diabrotica elata*, Fabr.

Syst. El., i., p. 454; Oliv., Ent., vi., p. 660, t. 5, fig. 79.

Subelongata, postice ampliata, convexa, pallide flava, nitida, pectore capiteque nigris, antennis sordide fulvis; thorace convexo, disco non foveolato; elytris tenuiter punctatis, lateribus obsolete plicatis; utroque plaga magna basali communi, ad latera abbreviata, alteraque transversa pone medium postice emarginata, interdum communi, nigris.

Hab. Cayenne. Not uncommon in collections.

Head not broader than long; clypeal ridge ill-defined; antennæ filiform, nearly three-fourths the length of the body, the second

joint short, the third one-half longer, the fourth as long as the preceding two united. Thorax one-third broader than long; sides parallel and slightly sinuate from the base to just beyond the middle, thence obliquely rounded and converging towards the apex; disk, the extreme lateral margin excepted, convex, smooth, non-foveolate. Elytra oblong, dilated posteriorly, convex, slightly but distinctly excavated on the suture below the basilar space, minutely punctured, plicate on the sides, the subhumeral costa ill-defined, bounded within by a longitudinal groove.

Spec. 59. *Diabrotica arcuata*, Baly.

L. c., 1859, p. 271.

Hab. Colombia, Bogota, Magdalena River; in most collections.

Spec. 60. *Diabrotica Jacobiana*, Duvivier.

Mem. Soc. des Scien. de Liège, tom xi., p. 47.

Diabrotica Gemmingeri, Baly, Journ. Lin. Soc., xix., p. 225.

Var. A. Elytrorum fascia posticali obsoleta.

Var. B. Elytro utroque vittis duabus basalibus nigris, una communi, cæteris ut in var. A.

Diabrotica Jacobyi, Kirsch, Berl. Ent. Zeit., xxvii., 1883, p. 200.

Hab. Colombia (*Steinheil*, *Stober*). Coll. Jacoby and Baly.

Spec. 61. *Diabrotica Buckleyi*, Baly.

Ann. & Mag. Nat. Hist., 5th ser., iii., 1879, p. 80.

D. translucida, Jacoby, Proc. Zool. Soc., 1880, p. 603.

Hab. Ecuador. My collection and that of Mr. Jacoby.

Spec. 62. *Diabrotica discoidalis*, Baly.

Trans. Ent. Soc. Lond., 1865, p. 349.

Hab. Ecuador. Coll. Jacoby and Baly.

Spec. 63. *Diabrotica Kraatzi*.

Elongata, postice vix ampliata, convexa, flava, nitida, pectore tibiis, tarsis, femoribus interdum dorso, scutello capiteque nigris

antennarum articulis penultimis duobus albidis; thorace convexo, minute subcrebre punctato; elytris crebre subfortiter punctatis, lateribus plicatis; viridi-flavis, utroque maculis basalibus duabus parvis, una humerali, altera suturali, communi, fasciaque lata subarcuata, utrinque abbreviata, extrorsum paullo ampliata, inter medium et apicem posita, nigris.

Long. 4 lin.

Hab. Ecuador (*Buckley*). Two specimens in my collection.

Head scarcely broader than long; clypeal ridge elevated, well-defined; antennæ filiform, nearly four-fifths the length of the body, the second joint short, the third rather longer, the fourth more than equal in length to the preceding two united; the ninth and tenth white, the rest black. Thorax one-half broader than long; sides nearly straight and parallel from the base to beyond the middle, thence rounded and converging towards the apex; disk transversely convex, nitidous, minutely punctured. Elytra narrowly oblong, slightly dilated posteriorly, convex, plicate on the sides, the humeral costa ill-defined; surface obsoletely wrinkled, rather coarsely punctured.

Spec. 64. *Diabrotica nigromaculata*, Jacoby.

Proc. Zool. Soc., 1878, p. 154.

Anguste ovata, postice ampliata, convexa, nitida, subtus viridi-flava, pectore, tibiis tarsisque nigris; supra prasina, scutello capiteque nigris, antennis pallide flavo-piceis; thorace bifoveolato; elytris crebre tenuiter punctatis, ad latera plicatis: utroque maculis basalibus duabus, una humerali, altera suturali cuneiformi, communi, fasciaque pone medium, utrinque abbreviata, nigris.

Long, 2½ lin.

Hab. Ecuador (*Buckley*), Peru. Coll. Jacoby and Baly.

Head triangular, not longer than broad; clypeal ridge elevated, well-defined; antennæ filiform, nearly equal to the body in length, the second joint short, the third nearly one-half longer, the fourth longer than the preceding two united. Thorax about one-fourth broader than long; sides sinuate and slightly diverging from the base to beyond the middle, thence rounded and converging towards the apex; disk deeply bifoveolate. Elytra broadly oblong-ovate, dilated posteriorly, convex, minutely punctured, rather strongly

plicate below the humeral callus; disk with several very faint longitudinal sulcations, only visible when viewed obliquely.

This species, for the possession of which I am indebted to the kindness of Mr. Jacoby, differs in its smaller size and in the absence of any flavous coloration on the disk of the elytra. The specimen before me appears to be a ♀; in the absence of the other sex I am compelled to keep the two species distinct.

Spec. 65. *Diabrotica Gorhami.*

Anguste oblonga, postice vix ampliata, pallide prasina, nitida, abdomine flavo, pectore, scutello capiteque nigris, clypeo utrinque antennisque piceo-flavis, tibiis tarsisque fulvo-tinctis, thorace convexo, non-foveolato; elytris tenuiter sat crebre punctatis, ad latera plicatis, utroque vitta brevi suturali communi alteraque humerali nigris, macula transversa pone medium picea.

Long. 3 lin.

Hab. Ecuador (*Buckley*). A single specimen in my cabinet.

Head not longer than broad, subrotundate; clypeal ridge strongly raised; antennæ nearly three-fourths the length of the body, filiform, the second joint short, the third rather longer, the fourth longer than the preceding two united. Thorax nearly one-half broader than long; sides straight and parallel from the base to the middle, thence rounded and converging towards the apex; disk convex, obsoletely deflexed on the sides. Elytra oblong, slighly dilated posteriorly, convex, rather strongly plicate below the humeral callus, disk rather closely impressed with fine punctures.

Diabrotica Gorhami agrees to some extent with *D. nigromaculata*, Jac.; it is, however, more oblong in form, more convex and the disk of the elytra is without the longitudinal sulcations present in the latter species; the post-medial spot is probably at times more strongly developed.

Spec. 66. *Diabrotica quinquemaculata*, Fabr.

Galeruca quinquemaculata, Fabr., Syst. El., i., p. 452; Oliv., Ent., vi., p. 659, tab. 8, fig. 77.

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore, scutello capiteque nigris, antennis piceo-fulvis, articulis intermediis ultimoque piceis; thorace non-foveolato, fulvo-rufo; elytris sat crebre punctatis, lateribus obsolete plicatis; vittis basalibus tribus,

subcuneiformibus, fere ad medium extensis, et utroque plaga transversa pone medium, interdum postice emarginata, nigro-cyaneis.

Long. 3 lin.

Hab. Cayenne, Upper Amazons. My collection.

Longitudinal ridge on clypeus ill-defined; antennæ nearly four-fifths the length of the body, filiform, the second joint short, the third scarcely longer than the second, the fourth longer than the preceding two united; the fifth, sixth, seventh, eighth and eleventh joints piceous, the rest obscure fulvous. Thorax shaped as in *D. clata*. Elytra rather closely and distinctly punctured, not depressed below the basilar space, obsoletely plicate below the humeral callus.

This species differs from *D. clata* in the coloration of the thorax, in the more distinct punctuation of the elytra and in the different coloration of the elytral markings.

Spec. 67. *Diabrotica mutabilis*, Baly.

Journ. Lin. Soc., xix., p. 225.

Hab. Colombia. My collection.

Very closely allied to *D. tumidicornis*, Erichs.; separated by its broader more oval form and by the presence of several faint longitudinal sulcations on each elytron (these are not mentioned in the original description); the antennæ in the male are thickened as in the former species, but the two upper joints are less abruptly narrowed. In my original diagnosis of this insect I described the thorax as obsoletely bifoveolate: this is to some extent an error; the foveæ vary in depth, but in the majority of specimens are well-defined.

Spec. 68. *Diabrotica tumidicornis*, Erichson.

Wied. Arch., 1847, p. 167.

Diabrotica fulvofasciata, Jacoby, Proc. Zool. Soc., 1889, p. 281.

Elongata, postice vix ampliata, convexa, pallide viridis, nitida, capite, pectore, abdomine tibiisque flavis, his ad basin antennisque fuscis; thorace bifoveolato; elytris tenuissime punctatis, pallide prasinis aut viridi-flavis, ad basin interdum nigro-maculatis, plerumque viridi-marginatis.

Mas. Antennis extrorsum ampliatis, articulis ultimis duobus abrupte tenuibus.

Long. 2½—3 lin.

Hab. Peru, Callao; Bolivia. Coll. Baly and Jacoby.

Head trigonate; longitudinal ridge on clypeus well-defined; antennæ equal in length to the body, the second joint very short, the third nearly one-half longer, the fourth longer than the preceding two united, the seventh and following two joints in the ♂ thickened, the tenth and eleventh abruptly narrowed, not broader than the sixth. Thorax nearly one-fifth broader than long; sides very slightly diverging and faintly sinuate from the base to the middle, thence rounded and converging towards the apex; disk nitidous, more or less deeply bifoveolate, foveæ oblong or subelongate. Elytra narrowly oblong, scarcely dilated posteriorly, closely and finely punctured; the coloration varies from viridiflavous to prasinous, but in most specimens the outer margin and sometimes the suture are narrowly edged with a darker shade of green.

Spec. 69. *Diabrotica formosa*, Baly.

Journ. Lin. Soc., xix., p. 226.

Hab. Venezuela. My collection.

Spec. 70. *Diabrotica undecimpunctata*, Jac.

Cist. Ent., ii., p. 524.

Anguste ovata, postice paullo ampliata, modice convexa, prasina, nitida, pectore, tibiis, tarsis, scutello capiteque nigris, antennarum articulis duobus penultimis flavis; thorace bifoveolato; elytris crebre tenuiter punctatis; utroque vitta lata fulva a basi ad longe pone medium extensa, punctisque sex, 2, 2, 2 dispositis, nigris.

Long. 3 lin.

Hab. Chanchamayo (*Thamm*). A single specimen in Mr. Jacoby's collection.

Longitudinal ridge on the clypeus well-defined; antennæ filiform, nearly three-fourths the length of the body, the second joint short, the third one-half longer, the fourth more than twice the length of the preceding two united; the basal joint pale green, the following two piceous, the ninth and tenth pale flavous. Thorax about one-third broader than long; sides parallel and distinctly sinuate from the base to just beyond the middle, thence rounded and converging towards the apex; upper surface nitidous, deeply bifoveolate. Elytra convex, slightly but distinctly sulcate below

the shoulders, finely but closely punctured; each elytron with a broad fulvous vitta, which, commencing at the base, extends downwards to rather more than half-way between the middle and the apex; in addition are six small black spots, two basal, the inner one common, the outer one placed on the humeral callus, two just before the middle, and two half-way between the latter and the apex.

Spec. 71. *Diabrotica viridula*, Fabr.

Syst. El., i., p. 453.

Diabrotica optiva, Erichs., Wiegm. Archiv., 1847, i., p. 169.

D. fusco-maculata, Jacoby, Proc. Zool. Soc., 1878, p. 995; Biol. Cent. Amer., pt. vi., p. 528, pl. xxix., fig. 25, var.

D. ornatula, Baly, Journ. Lin. Soc., xix., p. 224.

Var. *inconstans*, Baly, *l. c.*, p. 224.

Hab. Peru, Ecuador, Amazons; also Colombia and Central America. Common in collections.

This widely-spread species varies in the coloration of the antennæ, tibiæ and tarsi, from flavous to nigro-piceous or black. Erichson describes the breast and antennæ as testaceous and the tibiæ and tarsi as flavous. His description of the markings on the elytra agrees with *D. fusco-maculata*, Jac., var. A, in the absence of the third fuscous spot. In *inconstans*, mihi, which I have united with the present species, each elytron has two large yellow patches, one basal, the other below the middle, the upper one being stained at its base with rufo- or nigro-piceous. *D. viridula* varies greatly in size.

Spec. 72. *Diabrotica prolongata*, Jacoby.

Cist. Ent., iii., p. 45.

Elongata, postice paullo ampliata, convexa, subtus nitida, flava, viridi-tincta, pectore nigro; supra minus nitida, læte prasina aut olivacea, scutello labroque nigris, antennis ad basin flavo-fuscis, ad apicem pallide flavis, articulis intermediis nigro-fuscis; thorace leviter trifoveolato; elytris sat crebre punctatis, ad latera plicatis, disco sulcis nonnullis longitudinalibus obsolete impressis; basi nec non margine externo fulvo-limbatis; utroque vitta humerali, ad medium extensa, macula suturali baseos, communi, alterisque discoidalibus tribus, longitudinaliter positis, nigro-piceis.

Var. A. Elytris pallide prasinis, vitta lata discoidali flava.

Long. 4 lin.

Hab. Brazil, Rio Janeiro (*Squire, Fry*). Coll. Jacoby, Fry, and Baly. Var. A, coll. Fry.

Head triangular; clypeal ridge rather strongly raised; antennæ filiform, nearly equal to the body in length, the second joint short, moniliform, the third nearly twice its length, the fourth longer than the preceding two united, the four lower joints fusco-flavous, with a greenish tinge, the following four piceous, the three upper ones piceo-flavous. Thorax about one-fourth broader than long; sides nearly straight and parallel from the base to beyond the middle, thence rounded and obliquely converging towards the apex; disk impressed with three shallow foveæ. Elytra narrowly oblong, scarcely dilated posteriorly, convex, plicate and strongly carinate below the humeral callus, disk rather closely punctured, impressed with several faint longitudinal sulcations; each elytron with a narrow submarginal vitta, which covers the subhumeral costa and extends downwards as far as the middle, and four small spots, one basal common and three discoidal, one immediately below the basal margin, another just before and a third immediately below the middle, nigro-piceous.

The number and position of the dark markings on the elytra appear to vary greatly; in two specimens I have seen they form two narrow interrupted linear fasciæ.

Spec. 73. *Diabrotica speciosa*, Germ.

Insect. Spec., p. 602, 1824 (*Galeruca*).

Diabrotica hexaspilota, Baly, Journ. Lin. Soc., xix., p. 228.

Oblongo-ovata, postice paullo ampliata, convexa, prasina, nitida, scutello, tibiis tarsisque nigris, capite rufo-testaceo, antennis extrorsum piceis, labro plerumque piceo aut nigro; thorace longitudine latiori, lævi, utrinque plus minusve distincte foveolato (interdum lævi); elytris tenuiter punctatis, utroque maculis tribus, prima ad basin, secunda prope medium tertiaque inter medium et apicem positis, flavis ornatis.

Var. A. Pectore rufo-testaceo, tibiis tarsisque fuscis aut nigris. *Diabrotica vigens*, Erichs., Wiegm. Archiv., 1847, p. 147.

Var. B. Capite (antennis exceptis) nigro, cæteris ut in typo; elytris suturæ basi interdum nigro-lineata. *Diabrotica Simoni*, Jac., Proc. Zool. Soc., 1889, p. 280.

Var. C. Elytrorum maculis flavis fere aut totis obsoletis, cæteris ut in vars. B. and C. *Diabrotica amabilis*, Baly, *l. c.*, p. 222;

D. simulans, Baly, *l.c.*, p. 222; *D. Simoni*, Jacoby, var., *l.c.*, 1889, p. 280.

Hab. Brazil, Tejuca, Petropolis (*Gray*); St. Catharine (ex col. *Deyrolle*); Tucuman, type and var. A (*Lord Dormer*); Peru, Chanchamayo, vars. A and B (*Thamm*); Bolivia, vars. B, C; Cayenne, var. A; Amazons, var. A (*Bates*); Colombia, vars. A, C, and D (*Steinheil*); Mexico, var. B. In most collections.

Head not longer than broad, triangular; clypeus with a broad longitudinal ridge; antennæ shorter than the body in both sexes, filiform, the second and third joints short, nearly equal, the fourth slightly longer than the preceding two united. Thorax slightly broader than long; sides nearly parallel and slightly sinuate from the base to beyond the middle, thence obliquely converging towards the apex, hinder angles subacute; upper surface moderately convex, smooth, impressed more or less distinctly on either side with a round fovea, which is in some specimens ill-defined and in many instances entirely obsolete. Elytra ovate, dilated posteriorly, their apices rounded; above convex, not plicate below the humeral callus, finely but rather closely punctured.

This common and variable species is found in nearly all the warmer parts of the South American continent and also in Mexico and other parts of Central America; it varies greatly in the coloration of the head, under surface of the body and in the presence or absence of the yellow markings on the elytra; these markings, when present, appear to differ but little in form. The foveæ on the thorax, as stated above, vary from being well-defined to entirely obselete, every stage being found between the two extremes. Having nearly one hundred specimens of the different forms, both in sculpture and coloration, now under my observation, I cannot but regard them as varieties of the same species, therefore am compelled to unite them under a single head.

Mr. Jacoby, in his diagnosis of *D. Simoni*, gives the thorax in the ♀ as being marked with four piceous spots. I have several specimens in my collection in which the thorax is more or less distinctly marked with piceous or fulvous, evidently the result of fading after death.

Spec. 74. *Diabrotica balteata*, Leconte.

Proc. Acad. Phil., 1865, p. 213; Jac., Biol. Cent. Amer., Col., vi., pt. i., p. 230, tab. xxix., fig. 23.

Diabrotica Sallei, Baly, Journ. Lin. Soc., xix., p. 227.

Hab. Colombia (*Steinheil*); Central and North America. Common in collections.

Spec. 75. *Diabrotica luteopustulata.*

Anguste ovata, postice ampliata, convexa, prasina, nitida, postpectore, tibiarum dorso tarsisque piceis, scutello capiteque rufofulvis, labro nigro, antennis piceo-fuscis, ad basin et ante apicem pallidis; thorace lævi, leviter bifoveolato; elytris sat crebre, tenuiter punctatis, utroque maculis tribus, longitudinaliter dispositis, sæpe confluentibus, fulvis.

Var. A. Thoracis foveis obsoletis.

Long. 4 lin.

Hab. Colombia, Cauca. My collection.

Head scarcely longer than broad, triangular; clypeus with a strongly-raised longitudinal ridge; antennæ filiform, equal to the body in length in the ♂, rather shorter in the ♀; the second and third joints short, equal in length in the ♂, the third rather longer than the second in the ♀; piceo-fuscous; the three or four lower joints, together with the ninth, tenth, and basal portion of the eleventh, flavous, more or less stained with piceous. Thorax nearly one-fourth broader than long; sides rather deeply sinuate behind the middle, the latter rounded, slightly produced laterally; upper surface rather abruptly deflexed on the sides, slightly flattened on the hinder disk, impressed on either side with a small fovea (these foveæ are sometimes entirely obsolete). Elytra oblong, slightly dilated posteriorly, their apices conjointly regularly rounded in the ♂, obtusely rounded in the ♀; convex, not depressed below the basilar space, rather closely punctured, plicate below the humeral callus, the subhumeral costa well-defined, extending downwards as far as the middle of the elytron and bounded within by a deep sulcation; each elytron with three large subrotundate and more or less confluent fulvous patches, placed longitudinally, one at the base, a second about the middle, and the third between the middle and the apex.

Spec. 76. *Diabrotica glaucina.*

Proc. Zool. Soc., 1889, p. 93.

Anguste ovata, postice ampliata, convexa, sordide fulva, nitida, labro antennisque piceis aut nigro-piceis, his ad basin fulvis, ante apicem flavo-albidis, articulo apicali nigro; thorace convexo; elytris tenuiter sat crebre punctatis, ad latera plicatis, disco exteriori ante medium obsolete longitudinaliter sulcato; utroque pustulis magnis quatuor, longitudinaliter positis, fulvis, pustulis duobus anticis plerumque confluentibus.

Long. 3 lin.

Hab. Cayenne. My collection.

Head triangular, not longer than broad; clypeus with the longitudinal ridge strongly elevated, well-defined; antennæ filiform, equal to the body in length, the second joint short, moniliform, the third slightly longer than the second, the fourth longer than the preceding two united; piceous or nigro-piceous, the three lower joints fulvous, the ninth and tenth yellowish white, the eleventh black. Thorax one-fourth broader than long; sides nearly parallel and slightly sinuate from the base to just beyond the middle, rounded anteriorly, converging towards the apex; above convex, shining, impunctate. Elytra narrowly oblong, very slightly dilated posteriorly, their apices conjointly regularly rounded, convex, finely and rather closely punctured, outer disk anteriorly with several longitudinal sulcations; plicate below the humeral callus, subhumeral costa broad, extending downwards as far as the middle of the elytron.

Spec. 77. *Diabrotica curvipustulata.*

Anguste ovata, postice ampliata, convexa, nitida; subtus flava, thorace femoribusque prasinis, tibiis piceo-tinctis; supra prasina, antennis basi excepta, piceis; thorace bifoveolato; elytris crebre puncta disco sulcis longitudinalibus leviter impresso; utroque pustulis flavis tribus ornatis, harum una basali, rotundata, secunda humerali, ad disci medium fere extensa, intus curvata, apicem versus ampliata, tertiaque sublunata, pone medium posita, fulvis.

Long. 3 lin.

Hab. Colombia; Nicaragua (*Janson*). Coll. Fry and Baly.

Head not longer than broad; labrum fulvous; eyes black; antennæ filiform, nearly equal to the body in length, the second joint short, the third slightly longer, the fourth rather longer than the preceding two united; the basal joint pale green, the second

and third piceo-fulvous, the rest piceous, the two upper ones rather paler than the rest. Thorax rather more than one-third broader than long; sides sinuate and slightly diverging from the base to the middle, rounded anteriorly; disk shining, bifoveolate. Elytra oblong-ovate, slightly dilated posteriorly, convex, closely and distinctly punctured; plicate below the humeral callus, disk of each elytron with five or six shallow broad longitudinal sulcations.

The more strongly punctured sulcate elytra, together with the different form of the fulvous markings, will at once separate the above insect from *sexmaculata*, mihi, the only species with which it can be confounded.

Spec. 78. *Diabrotica gracilis*, Jac.

Proc. Zool. Soc., 1878. p. 150.

Anguste ovata, postice paullo ampliata, convexa, prasina, nitida, pectore, tibiis, tarsis, capite, scutello elytrorumque linea basali communi nigris; antennis ad basin prasinis, ante apicem flavo-albidis; thorace bifoveolato; elytris crebre punctatis, ad latera plicatis; utroque plagis duabus, una basali, altera pone medium, flavo-fulvis.

Long. 2½ lin.

Hab. Brazil. Unique in Mr. Jacoby's collection.

Clypeal ridge well-defined; antennæ slender, filiform, the second and third joints short, nearly equal, the fourth longer than the preceding two united; the basal joint pale green, the ninth and tenth yellowish white. Thorax scarcely one-fourth broader than long; sides parallel and distinctly sinuate from the base to beyond the middle, thence obliquely converging towards the apex; disk deeply bifoveolate, nitidous, impressed with very minute punctures, only visible under a deep lens. Elytra oblong-ovate, scarcely dilated posteriorly; convex, distinctly and rather closely punctured; plicate below the humeral callus, subhumeral costa extending to just beyond the middle of the elytron, bifurcate at its base.

Spec. 79. *Diabrotica bipustulata*, Baly.

Journ. Lin. Soc., xix, p. 221.

Hab. Venezuela. In most collections.

Spec. 80. *Diabrotica amœna*, Dalm.

Analect. Ent., 1823, p. 75.

Diabrotica Clarkella, Baly, Ann. & Mag. Nat. Hist., 1859, p. 271.

Hab. Brazil. Common in collections.

Spec. 81. *Diabrotica Grayella*, Baly.

Trans. Ent. Soc. Lond., 1886, p. 445.

Hab. Brazil, Petropolis, Constancia (*Gray*). In most collections.

The subsutural vitta at once separates this species from *D. Clarkella*, which in all other respects it closely resembles. In most collections.

Spec. 82. *Diabrotica apicipennis.*

Elongata, modice convexa, flava, nitida, pectore, ano, tibiis, tarsis, scutello capiteque nigris, antennis ad basin piceis, articulis novo et decimo albidis (artic. ult. fract,), thorace bifoveolato; elytris fere parallelis, crebre distincte punctatis, ad latera plicatis; utroque margine apicali, suturæ basi vittaque humerali nigro-piceis.

Long. 3 lin.

Hab. Brazil, Rio Janeiro (*Fry*). Unique in Mr. Fry's collection.

Head not longer than broad, triangular; clypeal ridge distinct; eyes large, prominent; antennæ filiform, the second and third joints short, the third rather longer than the second, the fourth longer than the preceding two united; the second and third joints piceous, the ninth and tenth white, the eleventh (in the single specimen known to me broken off). Thorax about one-third broader than long; sides nearly straight and parallel from the base to beyond the middle, thence obliquely converging and slightly rounded towards the apex; disk convex, deeply bifoveolate. Elytra subelongate, their sides nearly parallel; above moderately convex, rather closely and strongly punctured, plicate below the humeral callus; each elytron with the apical margin, a narrow sutural line at the base, together with a short humeral vitta, nigro-piceous.

Spec. 83. *Diabrotica atrosignata.*

Ovata, postice ampliata, convexa, flavo-fulva, nitida, pectore, scutello capiteque (antennis basi et apice exceptis) nigris; thorace leviter trifoveolato; elytris tenuiter sat crebre punctatis; flavis, utroque vittis subcuneiformibus duabus, basalibus interna communi, maculisque tribus ante apicem, triangulariter dispositis, nigris.

Long. 3½ lin.

Hab. Brazil. Coll. Fry and Baly.

Head triangular, not longer than broad; clypeus with a broad

longitudinal ridge; antennæ moderately robust, filiform, rather more than half the length of the body, the second joint short, the third more than one-half longer than the second, the fourth equal in length to the preceding two united; the three lower joints, together with the two upper ones, fulvous, the rest black. Thorax more than one-half broader than long; sides nearly straight and parallel from the base to beyond the middle, thence obliquely converging and slightly rounded towards the apex, the anterior angles obtuse, the hinder ones acute; upper surface smooth, impunctate, convex, flattened on the central disk, trifoveolate, the two anterior foveæ rather strongly impressed, the third small and ill-defined, placed just in front of the basal margin. Elytra ovate, rather strongly dilated posteriorly; above convex, finely and closely punctured.

Spec. 84. *Diabrotica septemliturata*, Erichs.

Diabrotica lineolata, Kirsch, Berl. Entom. Zeits., xxvii., p. 202, 1883.

Subelongato-ovata, postice ampliata, convexa, pallide flava, pectore, ore antennisque nigris, his ad basin plerumque flavis, apice albido, articulis intermediis interdum fuscis; thorace excavato, trifoveolato, foveis interdum fere obsoletis; elytris ad latera plicatis; utroque vittis basalibus duabus, brevibus, una communi, altera humerali, maculisque linearifórmibus duabus, pone medium transversim positis, nigris.

Var. A. Capite rufo-piceo aut nigro.

Diabrotica septemliturata, Erichs., Wiegm. Archiv., 1847, i., p. 167.

Var. B. Elytri vittis basalibus confluentibus, capite ut in var. B.

Var. C. Elytri maculis posticis duabus inter se confluentibus.

Var. D. Ore flavo.

Hab. Peru, Chanchamayo (*Thamm*); Amazons (*Bates*); Bolivia. Common in collections.

Head not longer than broad; clypeal ridge ill-defined; antennæ filiform, rather more than three-fourths the length of the body, the second joint short, the third one-half longer, the fourth slightly longer than the preceding two united; black, the three outer joints yellowish white, the three or four basal ones sometimes piceo-flavous; in some specimens the antennæ are entirely of this latter colour, the intermediate joints being scarcely, if at all, darker than the rest. Thorax one-third broader than long; sides parallel and

faintly sinuate from the base to the middle, obsoletely dilated and rounded anteriorly; above convex, hinder two-thirds of disk broadly excavated, more or less distinctly trifoveolate. Elytra oblong-ovate, dilated posteriorly, convex, plicate below the humeral callus; surface closely and distinctly punctured.

After a careful examination of a long series of this variable species I cannot separate *D. lineolata*, Kirsch (the type-specimen of which, through the kindness of the author, I have before me) as a distinct specific form. The head varies in colour from entirely black to entirely flavous; the antennæ are also equally variable in tint. Dr. Kirsch lays stress on the absence of the discoidal foveæ of the thorax in his insect, but in the specimen before me they, although faint, are distinctly visible under a lens. Erichson only gives the thorax as bifoveolate, the third fovea is always less distinctly defined than the others and in some specimens possibly entirely obsolete.

D. septemliturata is separated from *D. Clarkella* by its smaller size, and by the difference in the sculpturing of the thorax. It is also much more variable in the pattern of its elytra than that species.

Spec. 85. *Diabrotica Dysoni*, Baly.

Journ. Ent. Soc., 1886, xix., p. 217.

Hab. Colombia; my collection. A single specimen.

D. Dysoni may be known by the form of the elytral markings, which are broad and of equal width throughout, their apices being abruptly truncate.

Spec. 86. *Diabrotica sedata.*

Anguste ovata, postice paullo ampliata, convexa, flava, nitida, pectore, oculis antennisque nigris, his ad basin piceis, apice sordide flavo; thorace leviter trifoveolato; elytris subnitidis, sat crebre punctatis, ad latera leviter plicatis, disco sulcis nonnullis longitudinalibus obsolete impresso; utroque vittis brevibus basalibus duabus, una communi, altera humerali, vittulisque duabus longe pone medium oblique transversim positis, nigris.

Long. $3\frac{1}{2}$ lin.

Hab. Brazil; also Guatemala My collection.

Head slightly longer than broad; labrum pale piceous; clypeal ridge strongly raised, terminating before reaching the anterior

margin; antennæ filiform, four-fifths the length of the body, the second joint short, the third one-half longer, the fourth longer than the preceding two united; the two lower joints piceous, the three upper ones obscure fulvous, the rest black. Thorax about one-half broader than long; sides sinuate and nearly parallel from the base to just beyond the middle, thence obliquely converging and slightly rounded towards the apex; above convex, slightly excavated on the hinder two-thirds of the disk, obsoletely trifoveolate. Elytra oval, slightly dilated posteriorly; convex, rather broadly margined; above convex, subnitidous, distinctly punctured, obsoletely plicate below the humeral callus, disk faintly impressed with several ill-defined longitudinal sulcations.

Spec. 87. *Diabrotica Clarkella*, Baly.

Proc. Zool. Soc., 1889, p. 93.

Subelongata, postice paullo ampliata, modice convexa, flava, nitida, dorso interdum fusco tincto, pectore antennisque nigris, his ad basin et ad apicem fulvis; thorace convexo, disco excavato, plus minusve distincte bifoveolato; elytris crebre punctatis, ad latera plicatis; utroque vittis basalibus brevibus duabus, una communi, altera humerali, maculisque duabus pone medium, oblique transversim positis, nigris.

Var. A. Elytrorum maculis posticis confluentibus, capite nigro-piceo.

Long. 3½—4 lin.

Hab. Brazil, Petropolis, Constantia (*Gray*). In most collections.

Head not longer than broad; clypeal ridge only slightly raised, not well-defined; antennæ rather more than three-fourths the length of the body, filiform, the second joint short, the third scarcely one-half longer, the fourth equal in length to the preceding two united; the three lower and the three upper joints, together with the basal portion of the fourth, flavo-fulvous, the rest black. Thorax one-third broader than long; sides sinuate and nearly parallel from the base to the middle, thence slightly converging towards the apex, the anterior angles slightly thickened, obtuse, the hinder ones acute; above convex, the medial disk broadly excavated, impressed on either side with a shallow fovea. Elytra narrowly ovate, slightly dilated posteriorly, their apices regularly rounded; above convex, rather closely and strongly punctured, obsoletely rugulose, plicate below the humeral callus.

In some specimens the surface immediately sur-

rounding the elytral markings is paler than the rest of the disk.

Spec. 88. *Diabrotica simulata.*

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore scutelloque nigris, capite rufo-piceo, ore nigro; antennis sordide fulvis, articulis intermediis ultimoque nigris, thorace convexo, lævi; elytris sat crebre punctatis; utroque vitta humerali alteraque suturali, communi, maculisque duabus, pone medium transversim positis, nigris.

Long. $2\frac{3}{4}$ lin.

Hab. Amazons (*Bates*); a single specimen in my own cabinet.

Head not longer than broad, triangular; rufo-piceous, the mouth black; clypeus with a distinctly elevated longitudinal ridge; antennæ filiform, about three-fourths the length of the body, the second joint short, ovate, the third obconic, about one-third longer than the second, the fourth longer than the preceding two united; the four lower joints, together with the ninth and tenth, fulvous, the rest black. Thorax one-fourth broader than long; sides parallel and slightly sinuate from the base to beyond the middle, thence obliquely narrowed towards the apex; disk smooth, convex. Elytra oblong-ovate, dilated posteriorly, convex, rather closely and distinctly punctured, the subhumeral ridge only visible immediately below the humeral callus.

Separated from the following species, *Buqueti*, by the less distinct plication of the elytra and by the short subhumeral costa.

Spec. 89. *Diabrotica Buqueti.*

Ent. Month. Mag., xxv., p. 252.

Ovata, postice ampliata, convexa, flava nitida, pectore antennisque nigris aut piceis, his ad basin piceo-fulvis, articulis penultimis duobus albidis; scutello labroque piceis; thorace rufo-fulvo aut flavo, convexo, lævi; elytris crebre punctatis, ad latera plicatis; utroque linea suturali baseos, altera subhumerali lineisque brevibus duabus pone medium, transversim positis, nigris aut piceis.

Var. A. Elytrorum lineis posticis obsoletis.

Long. $3\frac{1}{2}$ lin.

Hab. Amazons, Ega (*Bates*); Peru. My collection.

Head not longer than broad, triangular; clypeus with a distinct longitudinal ridge; antennæ filiform, rather more than three-

fourths the length of the body, the second joint short, the third very slightly longer than the second, the fourth longer than the preceding two united. Thorax slightly broader than long; sides nearly parallel and sinuate from the base to the middle, thence rounded and converging towards the apex, the hinder angle slightly produced, acute; disk convex, impunctate. Elytra ovate, dilated posteriorly; upper surface rather strongly convex, closely punctured, distinctly plicate below the humeral callus, the subhumeral costa well-defined and extending to the middle of the elytron.

Spec. 90. *Diabrotica proximans.*

Anguste ovata, postice paullo ampliata, convexa, flava, nitida, pectore, scutello capiteque, antennis ad basin et ante apicem exceptis, nigris; thorace convexo, lævi; elytris sat crebre punctatis, utroque vittis duabus basalibus brevibus, una humerali, altera suturali communi maculaque sublaterali pone medium, nigris.

Long. 3 lin.

Hab. Upper Amazons. My collection.

Head triangular, not longer than broad; clypeal ridge well-defined; antennæ filiform, nearly equal to the body in length, the second joint short, moniliform, the third slightly longer, the fourth much longer than the preceding two united, the fifth to the eighth, together with the eleventh, black or piceous, the rest flavous. Thorax about one-third broader than long; sides parallel and very slightly sinuate from the base to beyond the middle, thence rounded and converging towards the apex, the anterior angles slightly produced, obtuse; disk convex, impunctate. Elytra ovate, slightly dilated posteriorly, convex, faintly grooved longitudinally below the humeral callus, rather closely punctured; the basal vitta wedge-shaped, scarcely extending for more than one-fourth the length of the elytra.

The black head, the less strong subhumeral plication of the elytra, together with the short basal vittæ and the absence of the inner post-medial spot, will separate this species from the preceding.

Spec. 91. *Diabrotica brevicornis.*

Subelongata, postice paullo ampliata, convexa, pallide flava, nitida, pectore capiteque nigris, antennis nigro-piceis ad basin et ad apicem pallidis; thorace lævi, disco postico leviter deplanato; scutello piceo; elytris crebre punctatis, ad latera distincte plicatis; utroque vittis brevibus basalibus duabus, una communi, altera humerali, maculaque sublaterali oblonga, pone medium posita, nigris.

Long. 3 lin.

Hab. Cayenne; a single specimen. My collection.

Head not longer than broad, triangular; clypeal ridge elevated, not sharply defined on the sides; antennæ rather more than half the length of the body, filiform, the second joint short, the third rather more than one-half longer, the fourth equal in length to the preceding two united; the three basal, together with the three upper joints, piceo-flavous, the rest nigro-piceous. Thorax rather broader than long; sides rounded and very slightly dilated anteriorly, nearly straight and parallel behind the middle; disk convex, its hinder portion very slightly flattened, nitidous, impunctate. Elytra narrowly oblong, dilated posteriorly, moderately convex, distinctly plicate below the humeral callus, rather closely but finely punctured; surface of disk here and there obsoletely wrinkled.

The short antennæ, scarcely exceeding half the body in length, separate this species from its congeners.

Spec. 92. *Diabrotica analis.*

Elongato-ovata, postice ampliata, modice convexa, flava, nitida, abdominis segmento anali, tibiis, tarsis, pectore, scutello capiteque nigris, antennis ad basin piceis aut piceo-fulvis, articulis penultimis duobus albidis; thorace transverso, convexo, lævi, utrinque obsolete foveolato; elytris convexis, sat crebre, distincte punctatis, ad latera plicatis; utroque linea suturali, communi, vitta brevi humerali lineaque submarginali ante apicem posita, nigris.

Mas. Antennis corpore paullo longioribus.

Long. 3 lin.

Hab. Brazil, Bahia (*Reed*). Coll. Fry and Baly.

Head not longer than broad; clypeal ridge ill-defined; antennæ filiform, equal to the body in length in the ♀, slightly longer in the ♂, the second joint short, subovate, the third one-half longer than the second, the fourth rather longer than the preceding two united; black, the three lower joints piceo-flavous or piceous, the ninth and tenth yellowish white. Thorax about one-third broader than long; sides nearly straight and parallel from the base to beyond the middle, thence obliquely converging towards the apex; disk convex, very faintly foveolate on either side, these foveæ sometimes entirely obsolete. Elytra oblong-ovate, slightly dilated posteriorly, their apices regularly rounded, convex, slightly flattened along the suture, distinctly and rather strongly punctured, outer disk with three or four very shallow longitudinal sulcations, in some cases nearly obsolete; subhumeral callus slightly raised and extending from the humeral callus to a short distance below the middle.

Spec. 93. *Diabrotica Westwoodi.*

Ent. Month. Mag., xxv., 252.

Anguste ovata, postice paullo ampliata, convexa, flava, nitida, pectore, scutello, labro antennisque nigris, his ad basin piceis, articulis externis tribus, ultimi apice excepto, albidis; thorace convexo, dorso obsolete deplanato, ad basin fovea obsoleta impresso; elytris subcrebre, tenuiter punctatis, ad latera plicatis; utroque linea suturali, a basi fere ad medium extensa, vitta humerali brevi, maculaque oblonga submarginali, nigris.

Long. 3½ lin.

Hab. Amazons (*Bates*). My collection.

Head triangular, scarcely longer than broad; clypeus with an ill-defined longitudinal ridge; antennæ nearly equal to the body in length, filiform, the second and third joints very short, nearly equal, the fourth longer than the preceding two united; black, the three lower joints pale piceous, stained above with black; the three upper ones yellowish white, the apex of the eleventh black. Thorax one-half broader than long; sides sinuate behind the middle, very slightly dilated and rounded anteriorly; upper surface convex, the hinder two-thirds of the disk obsoletely flattened, impressed at its base with a faint fovea. Elytra narrowly oblong-ovate, slightly dilated posteriorly, obtusely rounded conjointly at the apices; convex, slightly flattened along the suture, finely punctured, plicate below the humeral callus, the subhumeral ridge distinctly elevated and extending to just beyond the middle of the elytron.

Spec. 94. *Diabrotica Weisei.*

Ovata, postice ampliata, convexa, flava, nitida, pectore, scutello antennisque nigris, his ad basin piceo-fulvis, articulis penultimis duobus albidis; thorace convexo, rufo-testaceo; elytris convexis, ad latera plicatis, sat crebre punctatis, utroque linea brevi basali communi vittaque brevi humerali, nigris.

Long. 3½ lin.

Hab. Brazil, St. Catharine. My collection.

Head not longer than broad, labrum piceous; clypeal ridge rather broad, well-defined; antennæ nearly equal to the body in length, filiform, the second joint short, the third rather longer, the fourth longer than the preceding two united; the three lower joints piceo-fulvous, the tenth and eleventh white, the rest black. Thorax nearly one-third broader than long; sides parallel and distinctly sinuate posteriorly, rounded and converging towards the

apex in front; disk convex, smooth and shining, rufo-testaceous. Elytra broadly ovate, dilated posteriorly, convex, grooved below the humeral callus, the subhumeral costa elevated and extending to a short distance below the middle; surface rather closely punctured; outer margin rather broadly reflexed.

Separated from *D. Westwoodi* by its broader and more ovate form, the subhumeral groove being also less deeply impressed.

Spec. 95. *Diabrotica facialis.*

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore, scutello capiteque nigris, vertice, clypeoque utrinque flavis; antennis ad basin piceo-fulvis, articulis penultimis duobus flavo-albidis; thorace integro, nitido; elytris tenuissime subremote punctatis, lateribus plicatis; utroque linea suturali vittaque elevata subhumerali, postice abbreviatis, nigris.

Long. 4 lin.

Hab. Colombia, Bogota, Dresden Museum, and coll. Duvivier, Baly, and Jacoby.

Head triangular, not longer than broad, shining black, a patch on the vertex, together with the clypeus, the longitudinal ridge and the anterior margin excepted, flavous; antennæ filiform, more than four-fifths of the body in length, the second and third joints short, nearly equal, the fourth much longer than the preceding two united; the four lower joints piceo-fulvous, the fifth piceous, the following three, together with the apical one, black, the ninth and tenth yellowish white. Thorax about one-third broader than long; sides rounded anteriorly, parallel and slightly sinuate behind the middle; disk nitidous, convex, impunctate. Elytra oblong-ovate, dilated posteriorly, convex, strongly plicate below the humeral callus, the subhumeral costa strongly elevated and extending downwards below the middle, general surface minutely but rather remotely punctured; each elytron with a narrow sutural line, abbreviated just below the middle, and a linear vitta, which runs along the subhumeral costa and extends downwards a little beyond the medial line, black.

The yellow colour of the face in some cases extends upwards on the front; the subhumeral ridge is more strongly developed than in any of the allied species.

Spec. 96. *Diabrotica soroensis.*

Elongato-ovata, postice paullo ampliata, flava, nitida, pectore, labro antennisque nigris (horum articuli ultimi quatuor fracti

sunt); thorace lævi, obsolete trifoveolato, rufo-testaceo; elytris tenuiter subcrebre punctatis, ad latera plicatis, suturæ basi et utroque vitta humerali vix pone medium extensa, nigris.

Long. 3 lin.

Hab. Cayenne. My collection.

Head triangular; clypeal ridge ill-defined; labrum, eyes, and antennæ black; these last with the second joint short, the third nearly twice its length, the fourth longer than the preceding two united, the basal joint piceous (the four upper joints in the single specimen before me broken off). Thorax rather broader than long; sides parallel and sinuate from the base to the middle, slightly rounded anteriorly; disk convex, impunctate, faintly impressed on the hinder disk with three shallow foveæ. Elytra narrowly oblong, dilated posteriorly, convex, faintly impressed transversely below the basilar space, finely and rather closely punctured, strongly plicate on the side below the humeral callus, the subhumeral ridge strongly raised.

Spec. 97. *Diabrotica brevivittata.*

Subelongato-ovata, postice paullo ampliata, convexa, flava, nitida, pectore, ore antennisque nigris, his ad basin et ad apicem sordide flavis; thorace excavato, utrinque obsolete foveolato; elytris sat crebre punctatis, ad latera plicatis, utroque lineis basalibus brevibus duabus, una communi, altera submarginali, nigris.

Long. 3 lin.

Hab. Cayenne. My collection.

Head not longer than broad, triangular; labrum and eyes black, the latter large, prominent; antennæ filiform, equal to the body in length, the second joint short, the third one-half longer, the fourth longer than the preceding two united; the three lower joints, together with the two upper ones, piceo-flavous. Thorax nearly one-third broader than long; sides rounded anteriorly, sinuate and nearly parallel behind the middle; upper surface convex, hinder disk rather deeply excavated, obsoletely bifoveolate. Elytra narrowly oblong, slightly dilated posteriorly, moderately convex, plicate below the humeral callus, rather closely punctured.

Closely allied to *D. soroensis;* separated by the deeply excavated thorax and by the shorter elytral vittæ.

Spec. 98. *Diabrotica cavicollis.*

Subelongato-ovata, postice paullo ampliata, convexa, flava, nitida, pectore capiteque nigris, antennis ad basin et ad apicem pallide

piceis ; thorace rufo-testaceo, disco leviter excavato ; elytris minute punctatis, ad latera plicatis, utroque vittis basalibus duabus, lineariformibus, una communi, altera submarginali, nigris.

Long. $2\frac{3}{4}$ lin.

Hab. Brazil. My collection.

Head not longer than broad ; clypeal ridge ill-defined : antennæ filiform, rather shorter than the body, the second joint short, the third rather longer, the fourth slightly longer than the preceding two united ; the three lower, together with the tenth joints fulvo-piceous (the eleventh joint broken off). Thorax scarcely broader than long; sides rounded anteriorly, sinuate behind the middle, convex; the hinder disk slightly but distinctly excavated. Elytra narrowly oblong, slightly dilated posteriorly, convex, strongly plicate below the humeral callus, very minutely punctured ; the sutural vitta in this species terminates at the commencement of the middle third of the elytron, whilst the sublateral one extends to the lower end of the latter.

Spec. 99. *Diabrotica sesquilineata*, Erichs.

Wied. Archiv., 1847, p. 167.

Elongata, postice leviter ampliata, convexa, flava, nitida, pectore capiteque nigris, antennarum articulis ultimis tribus albidis; thorace scutelloque rufo-testaceis, illo excavato, obsolete trifoveolato ; elytris tenuiter punctatis, lateribus plicatis, utroque sutura, postice attenuata et longe ante apicem abbreviata, vitta humerali, ante apicem abbreviata, lineaque discoidali utrinque abbreviata, nigris.

Long. 3 lin.

Hab. Peru (*Thamm*) ; Upper Amazons. Coll. Fry and Baly.

Head triangular; longitudinal ridge on clypeus ill-defined; antennæ filiform, nearly equal to the body in length, the second and third joints short, equal in length, the fourth much longer than the preceding two united. Thorax slightly broader than long; sides very slightly produced and rounded anteriorly, parallel and very faintly sinuate from the base to beyond the middle ; hinder disk excavated, obsoletely trifoveolate. Elytra narrowly oblong, very slightly dilated posteriorly, finely and rather closely punctured, distinctly plicate on the sides, the subhumeral costa well-defined and extending below the middle of the elytron.

Erichson places this species in the division with the thorax bifoveolate ; in the specimen before me the foveæ

are very ill-defined, and it is very possible that occasionally the third one is obsolete; in all respects it agrees closely with his description. In the pattern of the elytra it resembles *D. atrivittata*, but differs in its narrower form and in the foveolate thorax.

Spec. 100. *Diabrotica atrivittata.*

Ent. Month. Mag., xxv., p. 252.

Ovata, postice ampliata, convexa, flava, nitida, pectore nigro, scutello capiteque nigro-piceis, antennis flavis, articulis intermediis oculisque nigris, thorace convexo, lævi; elytris crebre punctatis, ad latera plicatis, utroque suturæ basi, vitta humerali a basi ad longe pone medium extensa alteraque discoidali utrinque abbreviata, nigris.

Long. 3 lin.

Hab. Brazil, Rio Janeiro, St. Paulo (*Fry*). Coll. Fry and Baly.

Head triangular; clypeus with a well-defined longitudinal ridge; antennæ filiform, three-fourths the length of the body, the second joint short, the third nearly one-half longer, the fourth slightly longer than the preceding two united; pale flavous, the fifth to the eighth, together with the apex of the fourth, black. Thorax one-third broader than long; sides nearly straight and parallel from the base to the middle, thence obliquely rounded and converging towards the apex; above convex, shining, impunctate. Elytra broadly ovate, slightly dilated posteriorly, their apices broadly rounded; convex, rather closely punctured, subhumeral costa distinct, extending downwards as far as the middle of the elytron.

Spec. 101. *Diabrotica Kirbyi.*

Anguste oblongo-ovata, postice paullo ampliata, convexa, pallide flava, nitida, pectore, scutello capiteque nigris, pedibus antennarumque basi fulvo-flavis; thorace obsolete bifoveolato; elytris crebre punctatis, flavo-albidis, utroque sutura ante medium, vitta humerali fere ad apicem extensa, alteraque discoidali, utrinque abbreviata, nigris.

Long. 3 lin.

Hab. Brazil, Parana; a single specimen in my own collection.

Head triangular, not longer than broad; clypeus convex, the longitudinal ridge nearly obsolete; antennæ filiform, moderately robust, the second joint short, submoniliform, the third rather

more than one-half longer than the second, the fourth equal in length to the preceding two united; three lower joints fulvo-flavous, the fourth to the ninth black (the two upper ones in the single specimen before me broken off). Thorax nearly one-half broader than long at the base; sides sinuate from the base to the middle, thence rounded and converging towards the apex, posterior angles slightly produced, acute; above convex, slightly flattened on the disk, impressed on either side with a large shallow fovea. Elytra oblong, very slightly dilated posteriorly, their apices regularly rounded; above convex, rather closely punctured, plicate below the humeral callus, subhumeral ridge distinct, extending more than half-way between the middle of the elytron and its apex, its hinder portion less strongly elevated.

Spec. 102. *Diabrotica atrilineata.*

Ent. Month. Mag., xxv., p. 252.

Elongato-ovata, postice paullo ampliata, pallide flava, nitida, pectore oculisque nigris, antennis nigro-piceis aut nigris, apice flavo; thorace bifoveolato; elytris crebre punctatis, pallide flavis, suturæ basi, linea humerali, fere ad apicem extensa, pone medium late interrupta, lineaque brevi discoidali, nigris.

Long. 3 lin.

Hab. Brazil, Rio Janeiro (*Fry*). Coll. Fry and Baly.

Head not longer than broad, triangular, labrum stained at the base with piceous; clypeus with a well-defined longitudinal ridge; antennæ filiform, moderately robust, the second joint short, the third about one-half longer, the fourth slightly longer than the preceding two united; nigro-piceous or black, the three upper joints flavous. Thorax nearly one-fourth broader than long; sides parallel and slightly sinuate from the base to the middle, rounded anteriorly and converging towards the apex, the hinder angles slightly produced, subacute; medial disk distinctly excavated, impressed on either side with a large shallow fovea. Elytra narrowly oblong-ovate, slightly dilated posteriorly, their apices regularly rounded; above convex, rather coarsely and closely punctured; plicate below the humeral callus, subhumeral costa well-defined, extending to the middle of the elytron.

Spec. 103. *Diabrotica trifoveolata.*

Subelongata aut elongata, postice paullo ampliata, modice convexa, flava, nitida, pectore capiteque nigris, antennis nigro-piceis, ad basin et ad apicem pallidis; thorace rufo-testaceo, trifoveolato;

elytris crebre punctatis, ad latera plicatis; utroque linea brevi basali, communi, vitta submarginali a basi fere ad apicem extensa, interdum ante apicem subinterrupta, maculaque post-mediali inter vittam et suturam posita, nigris.

Long. 3—3½ lin.

Hab. Amazons (*Bates*). My collection.

Head not longer than broad; clypeal ridge well-defined; antennæ filiform, three-fourths the length of the body, the second joint short, the third one-half longer, the fourth equal in length to the preceding two united, two or three lower joints, together with the three upper ones, piceo-fulvous. Thorax one-fifth broader than long; sides parallel and slightly sinuate from the base to the middle, thence rounded and converging towards the apex; above convex, hinder disk excavated, trifoveolate. Elytra narrowly oblong, slightly dilated posteriorly, moderately convex, strongly plicate below the humeral callus, rather closely punctured.

Spec. 104. *Diabrotica confraterna.*

Proc. Zool. Soc., 1889, p. 94.

Oblongo-elongata, postice paullo ampliata, convexa, flava, nitida, pectore capiteque nigris, antennis ad basin piceis, ad apicem sordide fulvis; thorace convexo, obsolete trifoveolato, rufo-fulvo; elytris sat crebre punctatis, costa subhumerali vix elevata; utroque vitta brevi basali, communi, altera humerali, a basi ad longe ponc medium extensa maculaque parva oblonga inter medium et apicem posita, nigris.

Long. 2½—3 lin.

Hab. Upper Amazons; a single specimen in my own collection.

Head not longer than broad, triangular; clypeus with a distinct longitudinal ridge; antennæ filiform, nearly four-fifths the length of the body, the second joint short, the third nearly twice its length, the fourth as long as the preceding two united; the two lower joints piceous, the three upper ones piceo-fulvous. Thorax rather more than one-fourth broader than long; sides very slightly produced before the middle, sinuate posteriorly, obliquely converging towards the apex; above convex, very faintly impressed with three small foveæ, two, one on either side the disk, only visible when viewed obliquely, the third rather more distinct, subelongate, placed on the medial line just in front of the basal margin. Elytra narrowly oblong, very slightly dilated posteriorly, rather broadly margined on the sides, regularly rounded at the apex, convex,

distinctly punctured; subhumeral ridge broad, very slightly elevated, extending from the humeral callus to just below the outer and hinder angle of the elytron.

Rather broader than *D. trifoveolata*, its thorax distinctly trifoveolate.

Spec. 105. *Diabrotica contigua.*

Proc. Zool. Soc., 1889, p. 92.

Elongata, postice paullo ampliata, convexa, flava, nitida, pectore, scutello capiteque nigris, antennis ad basin et ad apicem flavis; thorace leviter trifoveolato, disco interdum piceo tincto; elytris sat crebre punctatis, disco sulcis nonnullis longitudinalibus leviter impresso, costa subhumerali fere ad apicem extensa; utroque linea suturali ante apicem abbreviata, ad apicem paullo ampliata, vitta humerali, a basi fere ad apicem extensa maculaque discoidali pone medium posita, nigris.

Long. 3 lin.

Hab. Brazil, Rio Janeiro. Coll. Baly and Fry.

Head not longer than broad, triangular; clypeus with a strongly raised well-defined longitudinal ridge; encarpæ thickened, transverse; antennæ filiform, nearly equal to the body in length, the second joint short, the third nearly one-half longer than the second, the fourth longer than the preceding two united; the three lower joints, the basal portion of the fourth, together with the three upper ones, flavous, the ninth more or less stained with fuscous, the rest black. Thorax one-half broader than long; sides slightly dilated and rounded anteriorly, rather deeply sinuate behind the middle, the hinder angles slightly produced, acute; disk impressed with three shallow foveæ. Elytra narrowly oblong, slightly dilated posteriorly, their apices regularly rounded, convex, finely but rather closely punctured; disk of each elytron impressed with four or five broad but shallow longitudinal sulcations; subhumeral costa strongly raised and extending nearly to the apex of the elytron.

This species may be known from the preceding two by the sulcations on the elytra.

Spec. 106. *Diabrotica boliviana.* v. Harold.

Mittheil. d. Munch. Ent. Verr., 1877, p. 111.

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore capiteque nigris, antennis pallide piceis, apice piceo-flavo, scutello

thoraceque rufis; hoc plus minusve distincte trifoveolato, fovea intermedia interdum obsoleta; elytris distincte, sat crebre punctatis, utroque vitta suturali communi basali, ante medium abbreviata, altera sublaterali, a basi ad longe pone medium producta maculaque oblonga discoidali pone medium posita, cyaneis aut viridi æneis.

Var. A. Elytrorum vitta sublaterali interrupta.

Var. B. Elytrorum macula discoidali cum sutura confluenti.

Long. 2½—3 lin.

Hab. Bolivia, Upper Amazons, and Peru. My collection.

Head not longer than broad, subtrigonate; clypeus with a broad longitudinal ridge; eyes large, prominent; antennæ filiform, four-fifths the length of the body, the second joint short, the third twice the length of the second, the fourth equal to the preceding two united; pale piceous, the four basal joints beneath, together with the three upper ones entirely, piceo-flavous. Thorax one-third broader than long; sides nearly parallel and slightly sinuate from the base to beyond the middle, thence rounded and obliquely converging towards the apex; upper surface convex, hinder disk moderately excavated, more or less distinctly trifoveolate, the middle fovea, which is placed just in front of the basal margin, sometimes obsolete. Elytra oblong-ovate, dilated posteriorly, their apices conjointly regularly rounded; convex, distinctly punctured, plicate below the humeral callus, the subhumeral costa distinct, bounded within by a longitudinal sulcation.

Spec. 107. *Diabrotica piceo-signata.*

Subelongata, postice paullo ampliata, convexa, flava, nitida, pectore capiteque nigris, antennis ad apicem flavis, thorace inferiori utrinque macula scutelloque piceis; thorace profunde bifoveolato, foveis fusco piceis; elytris subcrebre punctatis, utroque suturæ basi, vitta submarginali a basi fere ad apicem extensa, lineaque brevi pone medium, inter vittam et suturam posita, nigris.

Var. A. Thoracis maculis piceis obsoletis.

Var. B. Elytrorum macula post-mediali obsoleta.

Long. 3 lin.

Hab. Brazil, Tejuca (*Gray*). My collection.

Head triangular, not longer than broad; clypeus with an ill-defined longitudinal ridge; antennæ four-fifths the length of the body, filiform, the second joint short, subovate, the third about one-half longer than the second, the fourth equal in length to the preceding two united; black, the three upper joints flavous, the

three lower ones sometimes nigro-piceous. Thorax nearly one-half broader than long ; sides nearly parallel and sinuate from the base to beyond the middle, thence obliquely rounded towards the apex, the anterior angles obtuse, the hinder ones slightly produced, subacute; above convex, disk with a large ill-defined excavation, which is impressed scarcely behind the middle with two large deep foveæ, separated from each other by a narrow line, each fovea stained with a piceous spot; surface shining, impunctate. Elytra narrowly oblong, slightly dilated posteriorly, their apices regularly rounded; above convex, finely but distinctly punctured, plicate below the humeral callus, subhumeral costa extending below the middle.

Spec. 108. *Diabrotica nitidicollis.*

Proc. Zool. Soc., 1889, p. 92.

Subelongato-ovata, postice paullo ampliata, convexa, flava, nitida, pectore scutello capiteque nigris, antennarum apice flavo; thorace convexo, lævi, fulvo-rufo; elytris sat crebre punctatis, ad latera plicatis, costa subhumerali longe pone medium extensa; utroque linea suturali fere ad apicem extensa, linea humerali ante apicem abbreviata maculaque parva discoidali pone medium posita, nigris.

Var. A. Elytrorum macula discoidali obsoleta.

Long. $2\frac{1}{2}$—3 lin.

Hab. Brazil, Rio Janeiro (*Fry*). Coll. Fry and Baly.

Head triangular, not broader than long; clypeus with a well-defined longitudinal ridge; antennæ filiform, three-fourths the length of the body, the second joint short, the third distinctly longer, the fourth rather longer than the preceding two united; the three upper joints pale flavous, the second and third piceous. Thorax nearly one-half broader than long; sides parallel and slightly sinuate from the base to the middle, thence rounded and converging towards the apex; upper surface convex, shining, impunctate. Elytra oblong-ovate, slightly dilated posteriorly, their apices rather broadly rounded; above convex, distinctly and rather closely punctured, very faintly wrinkled, plicate below the humeral callus, subhumeral costa distinctly elevated and extending downwards to more than half-way between the middle and apex,

Separate from *D. picco-signata* by the non-foveolate thorax.

Spec. 109. *Diabrotica Meyeri.*

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore, abdominis apice, tibiis, tarsis, scutello capiteque nigris, antennis corpore vix longioribus, ad basin flavis, ante apicem albidis; thorace lævi, convexo; elytris distincte punctatis, ad latera plicatis, linea suturali integra, et utroque vitta submarginali ante apicem abbreviata et pone medium late interrupta, nigris.

Long. 3¼ lin.

Hab. Brazil. My collection.

Head slightly broader than long; clypeal ridge not well-defined; antennæ scarcely longer than the body, filiform, the second joint short, the third nearly one-half longer than the second, the fourth much longer than the preceding two united; the three lower joints flavous, the ninth and tenth white, the rest black. Thorax nearly one-half broader than long; sides parallel and very slightly sinuate from the base to beyond the middle; disk nitidous, convex. Elytra narrowly oblong-ovate, dilated posteriorly, convex, distinctly and rather closely punctured, outer disk with several broad shallow longitudinal sulcations; each elytron with the sutural margin, together with a sublateral vitta, the latter broadly interrupted below the middle and terminating some distance before reaching the apex, black or nigro-piceous.

Spec. 110. *Diabrotica diversicornis.*

Subelongata, postice vix ampliata, convexa, flava, nitida, pectore, abdominis apice, scutello capiteque nigris, antennis pallide flavis, articulis intermediis ultimoque nigris, tarsis fuscis; thorace convexo, lævi; elytris tenuiter sat crebre punctatis, ad latera plicatis, costa subhumerali distincta, fere ad apicem extensa; utroque linea suturali alteraque sublaterali, ante apicem interrupta, nigro-piceis.

Long. 2¼ lin.

Hab. Upper Amazons. My collection.

Head not longer than broad, subrotundate; clypeus with a distinct longitudinal ridge; antennæ filiform, shorter than the body, the second and third joints short, equal, the fourth longer than the preceding two united; pale flavous, the sixth to the eighth, together with the eleventh joints, black, the ninth and tenth yellowish white. Thorax scarcely one-fourth broader than long; sides straight and slightly diverging from the base to beyond the middle, thence rounded and obliquely converging towards the apex; disk convex, shining, impunctate. Elytra narrowly oblong,

scarcely dilated posteriorly; convex, distinctly but rather finely punctured, the general surface obsoletely wrinkled; subhumeral costa rather strongly raised, extending nearly to the apex of the elytron.

Spec. 111. *Diabrotica interrupta*, Baly.

Trans. Ent. Soc. Lond., 1886, p. 445.

Hab. Amazons (*Bates*). My collection.

Spec. 112. *Diabrotica venezuelensis*, Jacoby.

Cist. Ent., iii., p. 45.

Diabrotica virginella, Baly, Journ. Lin. Soc., xix., p. 228.

Hab. Venezuela. Coll. Jacoby and Baly.

Spec. 113. *Diabrotica rugulosa.*

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore, scutello capiteque nigris, antennis ad basin et ad apicem sordide fulvis; thorace sat profunde subarcuatim excavato; elytris rugulosis, ad latera plicatis, sulcis longitudinalibus obsolete impressis; utroque linea suturali, ante apicem abbreviata, lineaque elevata sublaterali, a basi fere ad apicem extensa, nigris.

Long. 3¼ lin.

Hab. Brazil, St. Catharine. My collection.

Head not longer than broad, triangular; clypeus with a longitudinal ridge; antennæ about three-fourths the length of the body, filiform, the second joint short, ovate, the third more than one-half longer, the fourth equal in length to the preceding two united; the three lower joints, together with the upper two, obscure fulvous. Thorax nearly twice as broad as long; sides slightly dilated and rounded anteriorly, sinuate behind the middle; above convex, the hinder disk deeply excavated. Elytra oblong-ovate, slightly dilated posteriorly, convex, irregularly but not deeply rugulose, rather strongly punctured, plicate below the humeral callus, the subhumeral costa raised, well-defined and extending beyond the middle; disk with four or five very shallow ill-defined longitudinal sulcations; each elytron with a narrow sutural line, abbreviated towards the apex, and a linear submarginal vitta, which, commencing at the base, runs along the subhumeral costa and extends to some distance below the middle, black.

Near *D. extensa;* separated by the pale basal joints of the antennæ, more deeply excavated thorax, and less strongly punctured elytra.

Spec. 114. *Diabrotica extensa.*

Proc. Zool. Soc., 1889, p. 93.

Subelongata, postice ampliata, convexa, flava, nitida, pectore, oculis, labro antennisque (his ad apicem exceptis), nigris; thorace leviter excavato, utrinque obsolete foveolato; elytris subrugulosis, sat crebre punctatis, ad latera plicatis, costa subhumerali fere ad apicem extensa; utroque linea suturali, postice abbreviata vittaque sublaterali super costam humeralem posita, nigris.

Long. $2\frac{3}{4}$ lin.

Hab. Brazil, Rio Janeiro (*Fry*); Bahia. Coll. Fry and Baly.

Head triangular, not longer than broad; clypeus with its longitudinal ridge ill-defined; antennæ filiform, three-fourths the length of the body, the second joint short, ovate, the third slightly longer, obconic, the fourth longer than the preceding two united; black, the three upper joints pale flavous. Thorax scarcely one-fourth broader than long; sides parallel and slightly sinuate from the base to beyond the middle, thence rounded and converging towards the apex, anterior and hinder angles distinctly produced, subacute; above convex, excavated on the hinder portion of the disk, and impressed more or less distinctly on either side with a shallow fovea. Elytra narrowly oblong, slightly dilated posteriorly, their apices regularly rounded; convex, rather closely punctured, subrugulose; plicate below the humeral callus, subhumeral costa extending downwards nearly to the apex of the elytron, curving inwards before its termination.

In a specimen from Bahia, in my own collection, the three basal joints of the antennæ are pale piceous, and there are faint traces of several longitudinal sulcations on the disk of each elytron; in all other respects it agrees with the typical form.

Spec. 115. *Diabrotica nigroscutata.*

Diabrotica scutellata, Baly.

Proc. Zool. Soc., 1889, p. 93.

Subelongato-ovata, postice ampliata, convexa, flava, nitida, oculis scutelloque nigris, pectore, ore antennisque piceis; thorace

leviter bifoveolato ; elytris sat crebre punctatis, ad latera plicatis, costa subhumerali ad longe ultra medium extensa ; utroque vitta sublaterali super costam subhumeralem posita, picea, sutura obsolete piceo-tincto.

Long. 3 lin.

Hab. Brazil. A single specimen in my own collection.

Head scarcely longer than broad, triangular ; clypeus with a well-defined longitudinal ridge ; antennæ filiform, rather more than half the length of the body, the second joint short, ovate, the third one-half longer, the fourth as long as the preceding two united. Thorax nearly one-third broader than long ; sides nearly straight and parallel from the base to beyond the middle, thence obliquely converging towards the apex ; disk convex, impressed on either side with a small but distinct fovea. Elytra narrowly oblong, slightly dilated posteriorly, their apices regularly rounded ; convex, rather closely punctured, subhumeral costa broad and straight for the whole of its course, extending downwards to about half-way between the middle of the elytron and the apex ; its surface covered by the piceous sublateral vitta, which commencing on the humeral callus is faint and nearly obsolete on the anterior disk.

The name first given by myself to this species having been already used by Mr. Jacoby in the 'Biologia,' I have changed it to the one above.

Spec. 116. *Diabrotica Reitteri.*

Elongata, postice paullo ampliata, convexa, flava, nitida, pectore, tibiis, tarsis capiteque nigris, antennis ad basin et apicem flavis, eucarpis piceis ; thorace rufo-fulvo, leviter trifoveolato ; elytris sat crebre punctatis, ad latera plicatis ; utroque vittis duabus, a basi ad longe pone medium extensis una suturali, communi, altera sublaterali, cyaneo-nigris.

Long. $3\frac{1}{4}$ lin.

Hab. Colombia, Cauca. A single specimen in my collection.

Head slightly longer than broad, wedge-shaped ; clypeal ridge ill-defined ; antennæ filiform, equal to the body in length, the second joint short, the third nearly twice its length, the fourth longer than the preceding two united ; the three lower joints, together with the three upper ones, fulvous, the rest black. Thorax not broader than long ; sides nearly straight and parallel from the

base to the middle, thence obliquely rounded and converging towards the apex; disk nitidous, its hinder two-thirds excavated, obsoletely trifoveolate. Elytra subelongate, very slightly dilated posteriorly; moderately convex, strongly plicate below the humeral callus, minutely punctured.

Spec. 117. *Diabrotica melanopyga.*

Proc. Zool. Soc., 1889, p. 92.

Elongata, postice paullo ampliata, convexa, flava, nitida, pectore, abdominis apice, tibiis, tarsis posticis capiteque nigris, antennarum articulis basalibus tribus ante penultimoque totis, et quarti quintique apicibus flavis, penultimo piceo; thorace bifoveolato; scutello, tibiis tarsisque anticis quatuor piceis, elytris sat crebre punctatis; utroque linea suturali apicem versus fere obsoleta, macula parva apicali vittaque humerali, fere ad apicem extensa, nigris.

Long. $2\frac{2}{3}$ lin.

Hab. Brazil, Rio Janeiro. A single specimen, from the late E. Deyrolle's collection, in my own cabinet.

Head not longer than broad, triangular; clypeus clothed on either side with adpressed fulvous hairs, the longitudinal ridge well-defined; antennæ filiform, moderately robust, nearly equal to the body in length, second and third joints short, nearly equal, the fourth slightly curved, much longer than the preceding two united; the three lower joints, the ninth, together with the apices of the fourth and fifth, flavous, the tenth piceous. Thorax rather more than one-half broader than long; sides straight and parallel from the base to the middle, thence obliquely converging towards the apex; above convex, impressed on either side with a large round fovea. Elytra narrowly oblong, scarcely dilated posteriorly, convex, distinctly punctured; plicate below the humeral callus, the subhumeral costa broad and extending nearly to the apex of the elytron.

Spec. 118. *Diabrotica submarginata.*

Elongata, postice vix ampliata, convexa, nigra, nitida, thorace bifoveolato, capite, antennis exceptis, elytrisque pallide piceis, horum margine basali, vittisque duabus, ante apicem abbreviatis, una suturali, altera submarginali, intus sinuata, nigris.

Long. $2\frac{3}{4}$ lin.

Hab. Brazil, St. Paulo. A single specimen in my own collection.

Head subrotundate, clypeal ridge raised; mouth and antennæ black, the latter filiform, equal to the body in length, the second and third joints very short, equal, the fourth nearly twice the length of the preceding two united. Thorax rather broader than long; sides rounded anteriorly, nearly parallel and sinuate behind the middle; disk impressed with two large deep foveæ. Elytra narrowly oblong, convex, strongly plicate below the humeral callus, very minutely punctured.

Spec. 119. *Diabrotica emorsitans.*

Elongata, postice paullo ampliata, modice convexa, prasina, nitida, tibiis, tarsis, labro antennisque nigris, harum basi scutelloque piceis; thorace profunde bifoveolato; elytris subnitidis, fortiter punctatis, leviter elevato-vittatis, vitta subhumerali magis fortiter elevata; utroque sutura, vitta submarginali, a basi fere ad apicem extensa intus late emarginata maculaque inter medium et apicem, ad vittam adfixa, piceis.

Long. 2 lin.

Hab. Brazil, Rio Janeiro (*A. Fry*). Coll. Fry and Baly.

Head triangular, scarcely longer than broad; clypeus with a broad ill-defined longitudinal ridge; antennæ slightly longer than the body in the ♂, rather shorter in the ♀, filiform, the second and third joints very short and equal in the ♂, the third rather longer in the other sex, the fourth longer than the preceding two united. Thorax about one-half broader than long; sides slightly diverging and obsoletely sinuate behind the middle, rounded and converging anteriorly towards the apex; disk moderately convex, deeply impressed on either side with a large round fovea. Elytra narrowly oblong, very slightly dilated towards the apex, the latter regularly rounded; upper surface moderately convex, slightly flattened along the suture, coarsely and rather closely punctured; each elytron with five or six narrow slightly elevated vittæ, the one below the humeral callus much broader and more strongly elevated than the rest.

Spec. 120. *Diabrotica minuta*, Jac.

Cist. Entom., ii., p. 526.

Elongata, postice paullo ampliata, convexa, prasina, nitida, pectore abdomineque viridi-flavis, vertice scutelloque nigris; tibiis, tarsis antennisque piceis; thorace bifoveolato; elytris ad latera plicatis, crebre punctatis; utroque linea angusta suturali, vitta sublaterali a basi ad medium extensa, ad apicem intus

ampliata, maculaque subapicali oblonga, cum vitta submarginali obsolete convexa, piceis.

Long. 2 lin,

Hab. Peru. Coll. Jacoby and Baly.

Head not longer than broad; longitudinal ridge on clypeus well-defined; labrum nigro-piceous; antennæ robust, the second and third joints short, equal in length, the fourth longer than the preceding two united. Thorax slightly broader than long; sides slightly diverging and sinuate from the base to beyond the middle, thence slightly converging towards the apex; disk shining, deeply bifoveolate. Elytra narrowly oblong, slightly dilated posteriorly; above convex, not depressed below the basilar space, distinctly and closely punctured, subhumeral ridge strongly raised, a slightly curved second ridge being placed just within the former.

Spec. 121. *Diabrotica virescens*, Baly.

Journ. Ent. Soc., xix., p. 223.

Hab. Colombia. Coll. Baly.

Spec. 122. *Diabrotica sublimbata*, Baly.

Trans. Ent. Soc. Lond., 1865, p. 347.

Hab. Amazons (*Bates*). My collection.

Spec. 123. *Diabrotica nigrostriata.*

Anguste ovata, postice ampliata, convexa, pallide flava, nitida, pectore, femorum apice, tibiis, tarsis, scutello, labro antennisque nigris, harum articulis duobus penultimis albis, articulis basalibus subtus piceis; thorace leviter bifoveolato; elytris crebre tenuiter punctatis, utroque linea suturali alteraque submarginali, integris apicibus confluentibus, nigris.

Mas. Antennarum articulis tertio et quarto incrassatis, cylindricis.

Long. 3½ lin.

Hab. Colombia, San Esteban. Coll. Simon and Jacoby.

Longitudinal ridge on clypeus ill-defined; antennæ rather more than two-thirds the length of the body in the ♀, rather longer in the ♂; the second joint short, the third one-half longer than the

second, the fourth as long or nearly so as the two preceding ones united, the third and fourth joints in the ♂ distinctly thickened. Thorax one-third broader than long, the sides parallel and slightly sinuate from the base to beyond the middle, thence rounded and converging to the apex; disk convex, smooth, impressed on either side with a shallow fovea. Elytra narrowly oblong-ovate, slightly dilated posteriorly, convex, not depressed below the basilar space, finely and closely punctured; each elytron with a sutural line extending from base to apex, together with a second also entire, submarginal and confluent at its extreme apex with the first.

Spec. 124. *Diabrotica limitata.*

Proc. Zool. Soc., 1889, p. 95.

Ovata, postice ampliata, convexa, flava, nitida, pectore, tibiis, tarsis, capiteque nigris, antennis ad basin piceis, ad apicem albidis; thorace flavo-rufo, disco late excavato, leviter trifoveolato, fovea intermedia minus distincta, interdum obsoleta; scutello piceo; elytris sat crebre punctatis, pallide flavis, utroque linea suturali, vitta submarginali his apicem versus abbreviatis, lineisque duabus, una vix ante medium, secunda inter medium et apicem, plerumque cum vitta submarginali confluentibus, nigris.

Long. 4 lin.

Hab. Eastern Ecuador (*Buckley*). Coll. Baly and Jacoby.

Head triangular, not longer than broad; clypeus with a slightly raised longitudinal ridge; antennæ more than three-fourths the length of the body, filiform, the second joint short, subovate, the third nearly twice its length, the fourth as long as the preceding two united; the three or four lower joints piceous, the three upper ones, the extreme apex of the eleventh excepted, yellowish white, the rest black. Thorax only slightly broader than long; sides nearly straight and parallel from the base to beyond the middle, thence obliquely converging towards the apex; upper surface shining, impunctate, hinder two-thirds of disk broadly excavated, trifoveolate, the two anterior foveæ well-defined, the middle one, placed just in front of the basal margin, smaller and sometimes obsolete. Elytra oblong-ovate, dilated posteriorly, their apices conjointly regularly rounded; above convex, faintly longitudinally sulcate on the outer disk about its middle, rather coarsely punctured, subrugulose.

Spec. 125. *Diabrotica rufolimbata*, Baly.

Ann. & Mag. Nat. Hist., 5th ser., iii., p. 74 (1879).

Hab. Rio de la Plata. My collection.

Spec. 126. *Diabrotica viridilimbata*, Baly.

L. c., iii., p. 74.

Hab. ——?. Unique in my own collection.

Spec. 127. *Diabrotica prasinomarginata.*

Anguste-ovata, postice ampliata, convexa, flavo-fulva, nitida, pectore tarsisque piceo-tinctis, scutello antennisque extrorsum nigris; thorace obsolete trifoveolato; elytris subnitidis, crebre punctatis, ad latera non plicatis, margine exteriori pallide prasino.

Long. 3½ lin.

Hab. Colombia. A single specimen in my own collection.

Head not longer than broad; clypeal ridge ill-defined; antennæ filiform, scarcely three-fourths the length of the body, the second joint short, the third scarcely longer than the second, the fourth longer than the preceding two united; the three lower joints concolorous with the head, the following four stained with piceous, the remaining four black. Thorax scarcely one-third broader than long; sides parallel and distinctly sinuate behind the middle, obliquely converging towards the apex anteriorly, the anterior angle slightly produced laterally into an obtuse tubercle; above convex, nitidous, faintly excavated and obsoletely trifoveolate on the hinder disk. Elytra ovate, slightly dilated posteriorly, convex, subnitidous, closely and rather deeply punctured, not plicate below the humeral callus, the outer limb very narrowly edged with pale green.

Very similar in colour to *D. Lebasii:* separated by the less deeply foveolate disk of the thorax, by the absence of any plication on the outer side of the elytron, and by the different coloration of the antennæ.

Spec. 128. *Diabrotica Lebasii*, Baly.

Journ. Lin. Soc., xix., p. 221.

Hab. Colombia. My collection.

Spec. 129. *Diabrotica unipunctata*, Jacoby.

Cist. Ent., iii., p. 47.

Var. A. Elytri macula discoidali obsoleta. *Diabrotica limbella*, Baly, *l. c.*, p. 218.

Hab. Colombia. Type coll. Jacoby; var. A; my collection.

Spec. 130. *Diabrotica nigrolimbata*, Baly.

L. c., xix., p. 218.

Hab. Colombia. My collection.

Spec. 131. *Diabrotica oculata.*

Elongata, postice vix ampliata, modice convexa, flava, nitida, pectore, abdomine, tibiis, tarsis, scutello capiteque nigris, antennarum articulis penultimis duobus albidis; thorace bifoveolato; elytris crebre punctatis, lateribus plicatis; utroque, limbo basali excepto, nigro limbato.

Mas. Antennis corpore longioribus, articulis secundo et tertio brevissimis, æqualibus, oculis magnis.

Long. 3 lin.

Hab. Brazil, Rio Janeiro (*Squire*). My collection.

Head triangular, slightly broader than long; eyes large, rotundate; antennæ longer than the body, filiform, the second and third joints very short, moniliform, the fourth more than twice the length of the preceding two united. Thorax nearly one-third broader than long; sides nearly straight and parallel, scarcely converging at the apex; disk nitidous, deeply bifoveolate. Elytra subelongate, scarcely dilated posteriorly, rather coarsely and closely punctured; the entire limb of each (the base excepted) edged with black.

The solitary specimen known to me (in which the terminal joint of the antennæ is broken off) is a male; the female is probably broader, with shorter antennæ and smaller eyes.

Spec. 132. *Diabrotica piccomarginata.*

Elongata, postice leviter ampliata, modice convexa, flava, nitida, pectore, scutello capiteque nigris, antennarum articulis

penultimis duobus albidis, tibiis tarsisque piceis, femoribus fulvo-tinctis; thorace bifoveolato; elytris subfortiter, sat crebre punctatis, limbo externo piceo, ad apicem nigro-piceo.

Long. $2\frac{2}{3}$ lin.

Hab. Bahia (*Reed*). My collection.

Head not longer than broad; clypeal ridge raised but not well-defined laterally; antennæ equal to the body in length, filiform, the second joint very short, the third slightly longer, the fourth longer than the preceding two united; the two or three basal joints nigro-piceous, the ninth and tenth white, the rest black. Thorax about one-fourth broader than long; sides slightly rounded anteriorly, abruptly sinuate just behind the anterior angles, nearly straight and parallel posteriorly; disk shining, impunctate, distinctly bifoveolate. Elytra subelongate, slightly dilated posteriorly, plicate on the sides, the subhumeral costa ill-defined, bounded within by a broad shallow sulcation; surface rather coarsely punctured, faintly wrinkled on the middle disk.

Spec. 133. *Diabrotica piceolimbata.*

Elongata, postice paullo ampliata, convexa, flava, nitida, pectore, capite, scutello elytrorum limbo abdominisque apice piceis, tibiis, tarsis, antennisque nigris, his ad basin piceis, ante apicem albidis; thorace leviter bifoveolato; elytris crebre punctatis, ad latera plicatis.

Long. $2\frac{3}{4}$ lin.

Hab. Upper Amazons. A single specimen in my own collection.

Head not longer than broad, triangular; clypeal ridge ill-defined; antennæ equal to the body in length, the second joint short, moniliform, the third one-half longer, the fourth longer than the preceding two united; the three lower joints obscure piceous, the ninth and tenth yellowish white. Thorax scarcely one-fourth broader than long; sides straight and parallel from the base to beyond the middle, thence rounded and converging towards the apex; disk nitidous, impunctate, impressed with two large shallow foveæ. Elytra narrowly oblong, convex, slightly flattened along the suture, rather strongly and closely punctured; outer disk plicate; each elytron with the basal and outer margins piceous, the piceous colour on the lateral border becoming paler along the outer edge, being scarcely darker than the disk itself.

Spec. 134. *Diabrotica Schaufussi.*

Elongata, postice paullo ampliata, nitida, sordide fulva, tibiis tarsisque piceis, supra olivacea, antennis piceo-fulvis; thorace lævi, lateribus anguste viridibus, disci basi fovea parva impressa; elytris minute punctatis, ad latera sat valde plicatis; apice lato margineque exteriori sordide fulvis, viridi-tinctis.

Long. 4 lin.

Hab. Bolivia. My collection.

Head triangular, not longer than broad; clypeal ridge distinct, well-defined; antennæ filiform, nearly equal to the body in length, the second joint short, the third half as long again as the second, the fourth much longer than the preceding two united; piceo-fulvous, the ninth and tenth paler than the rest, the seventh and eighth piceous, the eleventh nigro-fuscous. Thorax slightly broader than long; sides parallel and sinuate from the base to beyond the middle, thence obliquely converging towards the apex; disk convex, impressed at its base with a small but distinct fovea. Elytra narrowly oblong, scarcely dilated posteriorly, convex, strongly plicate below the humeral callus, very minutely punctured, their apical fourth, together with the outer margin, obscure viridi-flavous. Thighs (in the only specimen before me, which is probably a ♂), robust, the hinder pair slightly thicker than the others.

Spec. 135. *Diabrotica viridana*, Baly.

Trans. Ent. Soc. Lond., 1886, p. 443.

Hab. Chili. My collection.

Spec. 136. *Diabrotica liciens*, Fabr.

Syst. El., i., p. 461.

Anguste oblonga, postice paullo ampliata, convexa, flava, nitida, pectore, scutello, oculis labroque nigris, tibiis, tarsis antennisque, harum basi exceptis, pallide piceis; thorace lævi; elytris minute, sat crebre punctatis, linea communi basali nigra.

Long. $2\frac{1}{2}$ lin.

Hab. Brazil, Rio Janeiro. A single specimen in my cabinet.

Head not longer than broad, triangular; clypeus with a well-defined longitudinal ridge; antennæ filiform, slightly attenuated towards the apex, three-fourths the length of the body, the second and third joints very short, equal in length, the fourth much longer than the preceding two united; the three lower joints

flavous, the rest pale piceous. Thorax one-third broader than long; sides obsoletely sinuate and slightly diverging from the base to the middle, thence slightly rounded and converging towards the apex; disk convex, smooth, impunctate. Elytra oblong-ovate, slightly dilated posteriorly, their apices regularly rounded; above convex, finely but rather closely punctured, the subhumeral costa obsolete; each elytron with a short black sutural line, which covers the basal third of the suture.

Spec. 137. *Diabrotica evanescens.*

Proc. Zool. Soc., 1889, p. 94.

Anguste ovata, postice paullo ampliata, convexa, pallide viridi-flava, abdomine flavo, pectore, tibiis, tarsis, scutello capiteque nigris, antennarum basi picea; thorace longitudine paullo latiori, disco bifoveolato; elytris subnitidis, crebre punctatis, sordide flavis, fascia lata prope medium prasina, suturæ basi nigra.

Long. 3 lin.

Hab. Ecuador (*Buckley*). Unique in my collection.

Antennæ filiform, black, the three lower joints obscure piceous; second and third short, nearly equal, the fourth longer than the preceding two united. Thorax slightly broader than long; sides sinuate, nearly parallel from the base to beyond the middle, thence obliquely converging towards the apex; disk nitidous, impressed on either side with a large but shallow fovea. Elytra dilated posteriorly, convex, coarsely and rather closely punctured, each elytron plicate below the humeral callus; within the latter is a distinct but shallow longitudinal sulcation, a second less defined being placed on the medial line between the outer and inner disks; across the middle of the elytra, which are of a pale dirty yellow colour, is a broad ill-defined grassy-green fascia; the suture at its base is narrowly edged with black.

Spec. 138. *Diabrotica flavo-fulva.*

Ovata, postice ampliata, convexa, flavo-fulva, nitida, pectore, scutello labroque nigris, tibiis antennarumque articulis ultimis piceo-tinctis; thorace convexo, lævi; elytris fere impunctatis, lævibus, prope medium transversim impressis.

Long. 3 lin.

Hab. Cayenne. Coll. Fry and Baly.

Head not longer than broad; clypeal ridge prominent; antennæ filiform, three-fourths the length of the body, the second joint short, the third slightly longer than the second, the fourth longer

than the preceding two united. Thorax nearly one-third broader than long; sides parallel and sinuate behind the middle, obliquely converging towards the apex in front; disk convex, nitidous. Elytra oblong-ovate, convex, transversely impressed across the middle; surface shining, impunctate.

Spec. 139. *Diabrotica fulvescens.*

Late ovata, postice ampliata, valde convexa, sordide fulva, nitida, pectore, scutello capiteque nigris, antennis fulvo-piceis, tibiis tarsisque nigro-piceis; thorace convexo, lævi; elytris subventricosis, sat crebre punctatis.

Long. $3\frac{1}{4}$ lin.

Hab. Peru (*Thamm*). My collection; two specimens.

Head triangular, not longer than broad; clypeus with a longitudinal ridge; antennæ scarcely two-thirds the length of the body, filiform, the second and third joints short, nearly equal, the fourth longer than the preceding two united. Thorax rather more than one-half broader than long; sides nearly straight and parallel from the base to beyond the middle, thence obliquely converging towards the apex, the hinder angles subacute, the anterior ones obtuse; disk convex, shining, impunctate. Elytra subventricose, rather strongly dilated towards the apex, the latter broadly rounded; upper surface rather closely punctured.

Spec. 140. *Diabrotica atriceps.*

Anguste ovata, postice ampliata, convexa, flavo-albida, viridi vix tincta, nitida, pectore, tibiis, tarsis, scutello capiteque nigris, antennis sordide flavis; thorace leviter bifoveolato; elytris tenuissime punctatis, lateribus non plicatis.

Long. $2\frac{1}{2}$ lin.

Hab. Bogota. Dresden Museum and my collection.

Head triangular; antennæ filiform, four-fifths the length of the body, the second and third joints short, nearly equal, the fourth longer than the preceding two united. Thorax subquadrate, not broader than long; sides parallel and faintly sinuate from the base to beyond the middle, thence slightly rounded and slightly converging towards the apex; disk shining, impunctate, impressed on either side with a shallow fovea. Elytra very finely punctured, not plicate on the sides, the subhumeral costa obsolete.

Spec. 141. *Diabrotica atritarsis.*

Ent. Month. Mag., xxv., p. 252.

Anguste ovata, postice ampliata, convexa, flava, nitida, pectore, tibiis anticis ad apicem, tarsis anticis oreque nigro-piceis, tibiis posticis quatuor ad apicem, tarsis posticis, oculis antennisque nigris, harum articulis basalibus tribus flavis, antepenultimo penultimoque albidis ; thorace lævi, convexo ; elytris subfortiter punctatis.

Long. 3½ lin.

Hab. Upper Amazons. My collection.

Head not longer than broad, triangular; clypeus clothed with sericeous hairs, its medial ridge ill-defined ; antennæ filiform, four-fifths the length of the body, the second joint short, moniliform, the third one-half longer, the fourth more than equal in length to the preceding two united ; the three lower joints pale flavous, the ninth and tenth yellowish white, the rest black. Thorax rather more than one-half broader than long; sides parallel and very slightly sinuate from the base to just beyond the middle, thence slightly rounded and obliquely converging towards the apex, the anterior angles obtuse ; upper surface transversely convex, shining, impunctate. Elytra oblong, dilated posteriorly, their apices conjointly regularly rounded, convex, rather strongly punctured.

Spec. 142. *Diabrotica lutescens.*

Anguste oblonga, postice paullo ampliata, lutea, nitida, oculis nigris, antennis piceo-tinctis ; thorace nitido, leviter trifoveolato ; elytris sat crebre punctatis.

Long. 2 lin.

Hab. Brazil, New Friburg. A single specimen in my collection.

Head slightly broader than long; clypeal ridge ill-defined ; antennæ nearly equal to the body in length, filiform, the second and third joints short, equal, the fourth longer than the preceding two united. Thorax one-third broader than long ; sides diverging from the base to the middle, thence rounded and converging towards the apex ; disk shining, impunctate, impressed with three shallow foveæ. Elytra oblong, convex, not depressed below the basilar space, rather closely but not strongly punctured, middle disk obsoletely wrinkled.

Spec. 143. *Diabrotica ochreata*, Fabr.

Ent. Syst., i., pt. 2, p. 4; Syst. El., i., p. 456 (*ocreata*).

Anguste ovata, postice ampliata, convexa, flavo-fulva, nitida, pectore, tibiis plus minusve, scutello, labro, oculis antennarumque articulo ultimo nigris; thorace convexo, lævi; elytris convexis, prope medium transversim depressis, minute punctatis.

Long. $2\frac{2}{3}$—3 lin.

Hab. Brazil, West Indian Islands. My collection.

Head not longer than broad; clypeal ridge entire, broad, rather strongly elevated; antennæ equal to the body in length, filiform, the second and third joints short, the third being rather longer than the second, the fourth much longer than the preceding two united. Thorax one-half as broad again as long; sides nearly parallel and sinuate behind the middle, rounded anteriorly, converging towards the apex; disk convex, shining, impunctate. Scutellum black. Elytra oblong-ovate, dilated posteriorly, convex, transversely depressed across the middle, not plicate on the sides; surface very minutely punctured. Tibiæ to a greater or less extent black or nigro-piceous.

Three specimens labelled Brazil, formerly in the collection of the late E. Deyrolle, do not differ in the slightest degree from those from Guadeloupe.

Spec. 144. *Diabrotica asignata.*

Anguste ovata, postice ampliata, convexa, flava, nitida, tibiis, tarsis antennisque nigris, his ad basin flavis, articulis nono et decimo albidis; thorace convexo, lævi; elytris leviter rugulosis, crebre punctatis.

Long. $2\frac{3}{4}$ lin.

Hab. Cayenne. Unique in my collection.

Head scarcely longer than broad, triangular; clypeus with a broad longitudinal ridge; antennæ about four-fifths of the body in length, filiform, the second joint short, moniliform, the third distinctly longer, obconic, the fourth longer than the preceding two united; the three lower joints flavous, the ninth and tenth white, the rest black. Thorax about one-half broader than long; sides nearly parallel and obsoletely sinuate from the base to beyond the middle, thence obliquely converging towards the apex; upper surface convex, impunctate. Elytra oblong-ovate, dilated posteriorly, regularly rounded at the apices, convex, finely rugulose, strongly and closely punctured.

Spec. 145. *Diabrotica tibialis.*

Anguste ovata, postice paullo ampliata, convexa, flava nitida, antennis piceo-nigris, ad basin et ante apicem flavis, tibiis extrorsum piceis, thorace convexo, nitido; elytris tenuissime punctatis.

Long. 3½ lin.

Hab. Cayenne. My collection.

Head not longer than broad, triangular; clypeal ridge rather strongly elevated, entire; antennæ four-fifths the length of the body, filiform, the second and third joints short, equal, the fourth longer than the preceding two united; the four lower joints, together with the ninth and tenth, flavous, the rest pitchy-black. Thorax nearly one-half broader than long; sides nearly straight and parallel behind the middle, very slightly produced laterally just before the latter, thence slightly converging towards the apex; disk convex, entire, impunctate. Elytra oblong, slightly dilated towards the apex; convex, plicate below the humeral callus, the subhumeral ridge strongly developed, extending downwards to nearly half-way between the middle and apex; surface very minutely punctured, the puncturing only visible under a lens.

Spec. 146. *Diabrotica fulvcola.*

Ovata, postice paullo ampliata, convexa, fulvo-flava, nitida, pectore nigro, capite nigro-piceo, antennis ad basin fulvis, ante apicem albidis, thorace convexo, lævi; elytris sat crebre tenuiter punctatis, prope medium transversim impressis.

Long. 3½ lin.

Hab. Amazons (*Bates*). My collection, a single specimen.

Head not longer than broad, triangular, nigro-piceous, labrum black, clypeus rufo-piceous, its longitudinal ridge well-defined; antennæ filiform, nearly four-fifths of the body in length, the second joint short, the third nearly one-half longer, the fourth longer than the preceding two united; the three lower joints piceo-fulvous, the ninth and tenth yellowish white, the rest nigro-piceous. Thorax more than one-half broader than long; sides nearly parallel and very slightly sinuate from the base to beyond the middle, thence obliquely rounded and converging towards the apex; disk convex, nitidous. Elytra oblong-ovate, dilated posteriorly, convex, slightly plicate below the humeral callus, transversely depressed near the suture below the basilar space and again more strongly immediately below the middle of the disk.

This species agrees with *D. fulvo-flava* in the transverse sulcation of the elytra, but differs in the presence of the subhumeral plication.

Spec. 147. *Diabrotica pallescens.*

Subelongata, postice ampliata, convexa, dorso leviter deplanato, pallide viridi-flava, oculis nigris, tibiis tarsisque piceo-tinctis, antennis piceis, ad basin et ante apicem pallidis; thorace lævi; elytris sat crebre tenuiter punctatis, ad latera plicatis.

Long. 3 lin.

Hab. Upper Amazons. My collection.

Head not longer than broad; labrum pale piceous; clypeal ridge prominent, well-defined; antennæ filiform, rather more than four-fifths the length of the body, the second joint short, the third more than one-half longer, the fourth rather longer than the preceding two united; the three or four lower joints, together with the ninth and tenth pale flavo-piceous, the rest piceous. Thorax very slightly broader than long; sides nearly straight and parallel from the base nearly to the apex, slightly converging close to the latter; disk moderately convex. Elytra oblong, dilated posteriorly, their apices conjointly obtusely rounded; above convex, slightly but distinctly flattened along the suture; minutely punctured, strongly plicate below the humeral callus.

The flattened upper surface of the elytra separates this species from any others in the present group.

Spec. 148. *Diabrotica piceicornis.*

Proc. Zool. Soc., 1889, p. 93.

Anguste ovata, postice paullo ampliata, convexa, flava, nitida, plus minusve viridi-tincta, antennis pallide piceis, oculis nigris; thorace elytrisque pallide prasinis, illo bifoveolato, his tenuiter subcrebre punctatis, disco exteriori obsolete longitudinaliter sulcato; tarsis piceo-tinctis.

Long. 3 lin.

Hab. Brazil, Rio Janeiro, Petropolis (*Gray*). My collection.

Head not longer than broad, subtrigonate; clypeus with a strongly raised longitudinal ridge; antennæ nearly equal to the body in length, slender, filiform, the second joint short, moniliform, the third nearly equal in the ♂, one-half longer in the ♀, the fourth equal in length to the preceding two united. Thorax about

one-half broader than long; sides slightly dilated and rounded anteriorly, sinuate below the middle, the hinder angles slightly produced, subacute; disk minutely punctured, impressed on either side with a small round fovea. Elytra oblong-ovate, slightly dilated posteriorly, their apices conjointly regularly rounded; above convex, distinctly punctured, plicate below the humeral callus; on the inner side of the broad subhumeral ridge are several shallow longitudinal sulcations.

Spec. 149. *Diabrotica Bartleti.*

Subelongata, postice paullo ampliata, modice convexa, flava, nitida, pectore, tibiarum apice, tarsis capiteque, antennis ad basin et ante apicem oreque exceptis, nigris, scutello piceo; thorace leviter bifoveolato; elytris ad latera leviter plicatis, tenuiter subcrebre punctatis.

Long. 2 lin.

Hab. Upper Amazons. A single specimen in my collection.

Head not longer than broad, triangular; clypeal ridge not defined; antennæ nearly equal to the body in length, filiform, the second and third joints short, nearly equal, the fourth equal in length to the preceding two united. Thorax nearly one-half broader than long; sides slightly rounded, slightly converging at base and apex; disk convex, impressed on either side with a small shallow fovea. Elytra oblong, plicate below the humeral callus finely but distinctly punctured.

Spec. 150. *Diabrotica Fauveli.*

Anguste ovata, postice ampliata, flava, nitida, tibiis, tarsis, pectore capiteque nigris, antennis ad basin flavis, articulis nono decimoque albidis; thorace convexo, non-foveolato; elytris crebre, distincte punctatis, infra callum humerale obsolete sulcatis.

Var. A. Antennarum articulo decimo nigro.

Var. B. Scutello nigro, antennis ut in var. A.

Long. 2½ lin.

Hab. Brazil, Bahia (*Reed*). Coll. Fry and Baly, type and var. A; var. B in coll. Fry.

Head not longer than broad, face triangular; clypeal ridge slightly raised, ill-defined; antennæ slender, filiform, slightly longer than the body in the ♂, rather shorter in the ♀, the second and third joints short and equal in the ♂, the third rather longer than the second in the other sex, the fourth longer than the preceding two united; black, the three lower joints, together with the

basal portion of the fourth flavous, the ninth and tenth (this latter joint sometimes excepted) white. Thorax about one-third broader than long; sides nearly straight and parallel from the base to just beyond the middle, thence obliquely converging and slightly rounded towards the apex; disk convex, nitidous. Elytra rather closely and distinctly punctured, obsoletely sulcate below the humeral callus.

Spec. 151. *Diabrotica atriscutata.*

Anguste ovata, convexa, postice ampliata, flava, nitida, pectore, scutello, labro, oculis antennisque nigris, his ad basin flavis, ante apicem flavo-albidis, articulo ultimo piceo; thorace convexo, obsolete trifoveolato; elytris ad latera plicatis, minute punctatis, sutura ante medium obsolete piceo-marginata.

Long. 3 lin.

Hab. Amazons (*Bates*). A single specimen in my collection.

Head triangular, not longer than broad; clypeal ridge entire, not well-defined; antennæ nearly equal to the body in length, filiform, the second and third joints short, nearly equal, the fourth longer than the preceding two united; the three lower joints flavous, the fourth to the eighth black, the two following ones yellowish white, the eleventh piceous. Thorax rather more than one-third broader than long; sides rounded anteriorly, sinuate behind the middle; disk moderately convex, faintly impressed on either side and again just before the middle of the basal margin with a small shallow fovea. Elytra narrowly oblong, slightly dilated posteriorly, moderately convex, plicate laterally, the subhumeral costa well-defined and extending downwards for some distance below the middle; surface minutely punctured, the basal third of the suture obsoletely edged with nigro-piceous.

Spec. 152. *Diabrotica ægrota.*

Proc. Zool. Soc., 1889, p. 94.

Oblongo-ovata, postice ampliata, convexa, subtus flava, nitida, pectore, ano tibiis tarsisque nigris; supra subnitida, pallide viridiflava, scutello capiteque nigris, antennis ad basin piceis, ante apicem flavo-albidis; thorace longitudine latiori, lateribus fere rectis, reflexo-marginatis, disco transversim convexo, lævi; elytris crebre punctatis, subrugulosis.

Long. 4 lin.

Hab. Ecuador (*Buckley*). My collection; a single specimen.

Antennæ nearly equal to the body in length, filiform, the second joint short, the third slightly longer, the fourth distinctly longer than the preceding two united; black, the three lower joints piceous, the ante-penultimate and the penultimate yellowish white. Thorax rather broader than long; sides nearly straight and converging from the base to the apex, narrowly margined; disk transversely convex, impressed just in front of the basal margin with a shallow fovea, the rest of the surface smooth, impunctate. Elytra oblong, dilated posteriorly, convex, closely punctured, subrugulose; disk of each elytron with several very faint longitudinal sulcations.

Spec. 153. *Diabrotica crenulata.*

Anguste ovata, postice ampliata, convexa, pallide flava, nitida, pectore, scutello capiteque nigris, vertice antennisque piceis, tibiis tarsisque piceo-tinctis; thorace obsolete trifoveolato; elytris minute punctatis, disci medio irregulariter crenulato.

Long. 4 lin.

Hab. Ecuador (*Buckley*). My collection.

Head triangular, not longer than broad; clypeal ridge raised, not sharply defined; antennæ slender, filiform, the second and third joints very short, nearly equal in length, the fourth much longer than the preceding two united. Thorax nearly twice as broad as long at the base; sides slightly converging and slightly sinuate from the base to beyond the middle, thence obliquely converging towards the apex, the posterior angles slightly produced laterally, acute; disk convex, impressed with three small shallow foveæ. Elytra narrowly oblong, dilated posteriorly, convex, minutely punctured, the punctures less visible towards the apex; the middle third of the disk irregularly and coarsely wrinkled.

Spec. 154. *Diabrotica erythrodera*, Baly.

Ann. & Mag. Nat. Hist., 5th ser., iii., p. 82 (1879).

Hab. Peru. A single specimen, my collection.

Spec. 155. *Diabrotica subsulcata*, Baly.

Trans. Ent. Soc., 3rd ser., ii., 1865, p. 351

Hab. Colombia. Coll. Baly, Fry, Jacoby, &c.

Spec. 156. *Diabrotica viridans.*

Proc. Zool. Soc., 1889, p. 93.

Subelongata. postice paullo ampliata, convexa, prasina, nitida, antennis, pectore abdomineque pallide piceis, pedibus flavo-viridibus, thorace convexo, fere impunctato; elytris sat crebre punctatis, disco exteriori sulcis nonnullis longitudinalibus leviter impresso.

Long. 2½ lin.

Hab. Brazil, Constancia (*Gray*). Coll. Fry and Baly.

Head not longer than broad, triangular, labrum pale piceous; clypeus with a broad but ill-defined longitudinal ridge; antennæ nearly equal to the body in length, filiform, the second and third joints short, nearly equal, the fourth as long as the preceding two united. Thorax one-fourth broader than long; sides nearly parallel and slightly sinuate below the middle, very slightly converging anteriorly, all the angles subacute; disk convex, impunctate. Elytra narrowly oblong, slightly dilated posteriorly, their apices regularly rounded; above convex, faintly depressed transversely below the basilar space, finely but rather strongly punctured, plicate below the humeral callus, the subhumeral ridge extending below the middle; on its inner side are several very shallow longitudinal sulcations.

Spec. 157. *Diabrotica chloris.*

Anguste ovata, postice ampliata, convexa, prasina, antennis nigris, basi piceo-fulva, articulis penultimis duobus albidis; pedibus piceo-fulvis, femoribus posticis quatuor interdum viridi-flavis; thorace nitido, non foveolato; elytris lateribus obsolete plicatis, crebre tenuiter punctatis.

Long. 3 lin.

Hab. Upper Amazons. My collection.

Head triangular; clypeal ridge well-defined; antennæ filiform, more than four-fifths the length of the body, the second joint short, the third one-half longer, the fourth exceeding in length the preceding two united; black, the five lower joints piceo-fulvous, the ninth and tenth yellowish white. Thorax not broader than long; sides straight and parallel from the base nearly to the apex, slightly rounded and converging before reaching the latter; upper surface smooth and shining, non-foveolate, sides rather broadly margined. Elytra finely and closely punctured, obsoletely plicate on the sides, the subhumeral costa continued as far down as the middle, bordered within by a short shallow sulcation.

Separated from *D. viridans* by the different coloration of the antennæ, and by the much less distinct plication of the sides of the elytra.

Spec. 158. *Diabrotica labiata*, Baly.

Journ. Ent. Soc., xix., p. 233, 1886.

Hab. Colombia (*Steinheil*). My collection.

This species might be mistaken for a unicolorous variety of *D. speciosa*, but may be known by the subhumeral sulcation of the elytron.

Spec. 159. *Diabrotica chrysopleura*, Harold.

Col., Hefte xiii., p. 92.

Anguste ovata, postice ampliata, convexa, nigra, subtus nitida, abdomine viridi-aureo sericeo, pectoris lateribus pube adpressa aurea dense vestitis; pedibus pallide viridibus, plus minusve piceo-tinctis; supra subnitida, antennis pallide flavis, extrorsum pallide piceis, articulo basali nigro tincto; thorace excavato, utrinque sat profunde foveolato; elytris rugosis, irregulariter elevato-vittatis; sordide rufis, apice margineque externo nigris.

Var. A. Elytris totis rufis.

Var. B. Pectore abdomineque rufis, antennis pallide viridibus, extrorsum piceis.

Long. 3½—4 lin.

Hab. Colombia, La Luzula (*Steinheil*), var. A and B; Cauca, var. B. Not uncommon in collections.

Head triangular, clypeal ridge prominent, well-defined; antennæ filiform, nearly equal to the body in length in the ♂, rather shorter in the ♀, the second and third joints short, the fourth longer than the preceding two united; the six or seven lower joints pale yellow or yellowish green, the basal one usually stained with black or piceous, the four or five upper joints piceous. Thorax scarcely broader than long in the ♂, rather broader in the ♀; sides parallel and distinctly sinuate from the base to beyond the middle, thence obliquely rounded towards the apex; disk convex, its hinder portion excavated and impressed on either side with a deep fovea. Elytra convex, coarsely rugose, disk with a number of raised irregular vittæ, which anastomose with each other more or less distinctly on the outer disk.

Harold describes the elytra in this species as obscure purple; in all the specimens that I have seen they are rufous, more or less stained with piceous.

Spec. 160. *Diabrotica diversicolor.*

Anguste ovata, postice ampliata, convexa, nigra; femoribus posticis ad basin abdomineque fulvis, pedibus antennisque prasinis, his extrorsum pallide piceis, pectoris lateribus dense fulvo hirsutis; thorace bifoveolato; elytris crebre sat fortiter punctatis, ad latera plicatis, sordide rufis.

Long. 3½ lin.

Hab. Ecuador. Coll. Fry; a single specimen.

Head triangular, scarcely longer than broad; clypeal ridge ill-defined; antennæ filiform, rather more than three-fourths the length of the body, the second and third joints short, nearly equal; the fourth longer than the preceding two united; the seven lower joints prasinous, the four upper ones pale piceous. Thorax scarcely broader than long; sides parallel and sinuate from the base to beyond the middle, thence obliquely rounded and converging towards the apex; upper surface opaque, excavated on the hinder disk, impressed on either side with an oblique fovea. Elytra convex, strongly punctured, plicate below the humeral callus.

II. *Notes on a new genus of* Lycænidæ. By Lionel de Niceville, F.L.S., C.M.Z.S., &c.

[Read December 4th, 1889.]

I have asked my friend Mr. Distant to exhibit at a meeting of the Entomological Society a twig of walnut, on which will be found numerous egg-masses laid by a lycænid butterfly. I have proposed a new generic name for this species, which was described as long ago as 1865, by the late Mr. Hewitson, as *Dipsas odata*. I have called it *Chætoprocta*, with reference to the immense tuft of long hairs which clothe the end of the abdomen of the female butterfly. I think it is a good genus, as in neuration it differs considerably from *Zephyrus*, Dalman, the genus to which it is most closely allied. With the walnut-branch I have sent a pair of specimens of the imago of this little butterfly, which strongly reminds one of *Zephyrus* (*Thecla* auctorum) *quercus*, Linnæus, the common "Purple Hairstreak." Like it, *C. odata* is purple alone, that colour being rather more restricted to the base of the wings in the female than in the male. The under surface is silvery greenish-grey, banded and spotted with a darker colour. The butterfly is found, as far as I know, only in the north-western hilly portions of the Indian Empire, at elevations of from 5000 to 10,000 feet above the sea. It is single-brooded, flying from May to July, and is only found where walnut-trees grow, on which its larva feeds. In the day time it flies but little; when disturbed on beating a walnut or neighbouring tree, it "flops" off of one leaf on to another, resting with closed wings on the upper surface only. But in the late afternoon it rouses itself, flies backwards and forwards and round and round the walnut trees with great rapidity, and it is then that couples may frequently be taken together. If the end of the abdomen of the female be examined, it will be found to be furnished with a large closely-packed mass of long hair-like scales

of a pale ochreous satiny colour. The female lays its eggs in irregular rows, varying from two to four eggs in each row, the egg-mass when finished presenting a neat thatched appearance, and of an elongated form. It appears that the sticky egg, in passing from the abdomen of the mother, becomes thickly coated with the hairs at the end of her body, the basal portion of the hairs, which are dark, being attached to the egg, while the anterior portion of the hairs, which are greyish, remain free. The larva is of the usual lycænid form, pale green, and apparently lacks the dorsal gland on the eleventh segment and the two subdorsal tentacula on the twelfth segment commonly found in the larvæ of this family, and is consequently unattended by ants.

I should be glad if some members of the Entomological Society would try to breed this butterfly in England. On the twigs sent are numerous patches of live eggs; also many patches of dead ones, which were probably laid last year, and may be known from the others by the hairs having all been destroyed, and each egg having a round hole from which the young larva had escaped. It will be seen that in many instances fresh eggs are laid in continuation of an old egg-mass. I should be very glad to know if there is any other butterfly which coats its eggs with hairs in the way done by *C. odata*. The Zoological Society of London might perhaps be asked to try to breed the butterfly. The larvæ, I may add, will only eat the very freshest and youngest leaves of the walnut-tree.

III. *On the phylogenetic significance of the wing-markings in certain genera of the* Nymphalidæ. By Frederick A. Dixey, M.A., M.B., Fellow of Wadham College, and Demonstrator in the University Museum, Oxford.

[Read February 5th, 1890.]

Plates I., II. & III.

Everyone who has paid any attention to the perfect insects of the genus *Vanessa* and allied forms, must have been struck with the great general resemblance that exists between them in respect of their wing-markings.* In the investigation of which I now present the results, my first object has been to ascertain the exact extent of this resemblance by analysing the wing-patterns and reducing their constituent markings to a system; from this I have been led to search for homologues of the markings in certain other members of the family *Nymphalidæ*, and finally to use the interesting conclusions thus arrived at in an attempt to sketch the outline of a phylogeny for insects of the genera examined.

I need hardly point out that facts of the kind here dealt with, relating, that is to say, entirely to certain special external characters of adult forms, constitute only one kind of phylogenetic evidence out of many that could be brought; and that conclusions resting on them, though valuable as contributions towards the settlement of the question of kinship, must not be held to be final unless they are corroborated by the result of other lines of enquiry—especially those relating to the ontogeny of the various species concerned, and to their distribution in space and time.

* See a note in Weismann's 'Studies in the Theory of Descent' (English Edition, 1882, vol. ii., p. 447), by Prof. Meldola, who observes, "The genus *Vanessa* (in the wide sense) appears to be in a remarkable condition of what may be called phyletic preservation."

Moreover with reference to the study of these markings in especial, it must not be forgotten that the investigator is deprived of the assistance usually afforded to similar enquiries from the side of embryology, for the characters in question spring as it were at once into perfect being at a definite stage in the life of the individual; they have, so to speak, no growth, no embryology.* Nevertheless, in spite of these limitations, it would seem worth while to examine the evidence available from this source with as much accuracy as possible, to see how far it will go towards indicating lines of probable development, and to determine the direction in which such lines appear to lead. The conclusions so reached will no doubt need to be checked and corrected by evidence derived from other quarters, but ought, nevertheless, to be allowed their due weight in any settlement that endeavours to be final.

The amount of material available for the construction of a phylogeny of the *Nymphalidæ* as a whole has received a notable addition in an elaborate memoir by W. Müller ('Südamerikanische Nymphalidenraupen'), published in the 'Zoologische Jahrbücher,' Bd. I., 1886, pp. 417—678. His conclusions, however, as there given, extend in the main only to groups of higher importance than genera; and the sole data on which they rest are the facts of the larval and pupal ontogeny and habits, the perfect form being left out of account altogether.

In comparing the evidence of kinship derived from the study of immature stages with that obtainable from adult forms, it must not be forgotten that in cases such as the present, in which the immature stages have a separate and independent existence of their own, the conditions amid which the earlier periods of life are passed will have their own special influence upon the larval form and development, without necessarily producing any corresponding effect upon the form ultimately assumed; and that consequently the affinities disclosed by the larva do not always exactly correspond with those indicated by the perfect organism. This point, to which attention had in some degree been

* A possible exception to this general statement may exist in the pigmentation of the wings of certain pupæ. This point needs further investigation. See below, pp. 125—128.

previously directed by Darwin* and Lubbock,† has been fully treated of with great completeness of illustration by Weismann, in his essay on 'Phyletic Parallelism in Metamorphic Species,‡ where he has shown this want of congruence between larval and imaginal affinities to be especially well-marked among certain of the subgroups of the family now before us. In cases where the form-relationship of the larvæ does not coincide with that of the imagines we may find it difficult to determine which of the two is the more trustworthy guide to the real affinities of the species; but where the evidence from both sides can be shown to point in the same direction such grounds of doubt no longer exist, and we may claim to have gone far towards establishing the true phylogenetic relation. It is interesting therefore to find, as will appear before the end of this paper, that Müller's conclusions, as far as they go, and when due allowance is made for the facts just referred to, are in general accordance with the results to which I have been led by an entirely distinct method of investigation.

As a preliminary to the minute comparative study of the wing-markings, it will be well to lay down certain landmarks to serve collectively as a sketch outline of which the details may be afterwards filled in. For this purpose let us first of all glance at the costal margin of the fore wing in *V. urticæ* (fig. 1). Here occur three dark patches alternating with four areas of lighter ground colour, the innermost of which is red, the next two yellow, and the outermost white. These three dark patches I distinguish by the Roman numerals I., II., III., in order from within outwards; while to the four light coloured areas I give in similar order the letters A, B, C, D. Outside the white patch D comes the dark submarginal band. This I regard as in series with the costal patches, and accordingly recognise it as IV. Now these eight costal areas of alternate light and dark colour will be found in one form or another in most of the insects with which we shall have to deal; and I

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* 'Origin of Species,' p. 440 (1st Edition).

† 'Origin and Metamorphoses of Insects,' 1874; vid. esp. pp. 39, 70.

‡ 'Studies in the Theory of Descent,' English Edition by Prof. Meldola, 1882, vol. i. p.390—vol. ii., p. 554.

therefore propose to adopt the letters and numbers I have just given as a uniform means of distinguishing these markings both in figures and descriptions. In certain forms, as for instance *V. polychloros*, *V. io* (fig. 2), and the various species of the genus *Grapta*, they are as easily recognised as in *V. urticæ;* in others one or more may be obliterated (as A in *P. atalanta*, see fig. 3), the rest remaining easily recognisable; in others again some or all of the patches may be broken up into separate constituents, as in most members of the genus *Argynnis* (fig. 4), but, as will be shown, not in such a way as to lose their actual identity. When this resolution happens, I shall retain the letter or number already given as the collective designation of the entire group of constituent markings, while generally distinguishing the separate members by the Arabic numerals, 1, 2, 3, 4, &c., in the case of the dark, and the letters α, β, γ, δ, &c., in the case of the light areas. It will be seen in the sequel that in nearly every case the costal patch forms part of a series of markings which belongs or did belong to the entire wing, and indeed to both fore and hind wing alike. It will therefore be necessary, as we proceed, to enlarge the notions we have at first attached to the letters A to D, and the numbers I. to IV., and to make them stand for the whole range of marks, of which the most conspicuously and uniformly recognisable portions occupy the region of the costa. It will, moreover, in some cases be convenient to introduce a further division of groups into II. and II′., III. and III′., &c. (figs. 31, 37).

We may now begin the consideration of the wing-markings in detail, taking first—

1. *The series of light-coloured spots near the apex of the primaries.* — Comparing *Pyrameis cardui* with *P. atalanta*, we are at once struck with the identity of pattern shown by the apex of the fore wings in these species. On the black ground of this region in *P. cardui* occur four conspicuous white spots (fig. 5, α, β, γ, δ) arranged in a curve, the first and fourth being markedly larger than the other two. These are obviously homologous with the similar white spots in *P. atalanta* (figs. 6, 7), which are arranged in a curve of the same character and keep much the same relative size, β and γ being, however, a little smaller in *P. atalanta* than in *P. cardui*, and α showing distinctly

in the former species the crescent shape only indicated in the latter.

In *P. atalanta*, however, we find that the series does not end with no. 4, which we have called δ. There is in this species always present a fifth spot, continuing the curve, and in the female a sixth as well* (figs. 6, 7, ε, ζ); this last spot, a very small one, coming within the red band of the fore wing. Now the first of these spots obviously corresponds with the white costal patch in *V. urticæ*, which I have called D. I shall continue, therefore, to refer to the six spots under the names of the first six letters of the Greek alphabet, α, β, γ, δ, ε, ζ, speaking of them collectively as series D.

Although in the great majority of specimens of *P. cardui* only the first four terms of this series are represented, yet it sometimes happens that the fifth, and even in rare cases the sixth, is present as well. A specimen of *P. cardui* was caught at Mortehoe, North Devon, by Miss Daisy Longstaff, in the autumn of 1889 (fig. 8), in which ε is as distinct as in *P. atalanta*. Two specimens in the Hope Collection at Oxford show the same peculiarity; one being British, the other from North America. In most of these cases the spot is larger on the under surface of the wing than on the upper.†

On the other hand, in *P. huntera* and *P. myrinna*, which bear a general resemblance to *P. cardui*, I have never seen ε; but ζ is always present and usually very conspicuous (fig. 9).

In all other species of the genus *Pyrameis* the series is present in greater or less completeness. The spots most constantly present are α and δ. In those members of the group that approach *P. atalanta* in aspect, β and

* A specimen in the British Museum has this sixth spot on the left side and not on the right. Scudder, in his 'Butterflies of the Eastern United States,' 1889, does not notice this spot either in his description (vol. i., p. 442), or figure (vol. iii., pl. 2, fig. 6). The latter is expressly said to be of *P. atalanta* ♀.

† A third specimen of *P. cardui* in the Hope Collection shows the whole range from α to ζ; ζ is here well marked on the under-surface, but on the upper only faintly indicated, — being, indeed, reduced to a few scales of lighter shade than the general ground colour. A specimen in the British Museum resembles the Mortehoe specimen in the presence of ε, but differs from it in another respect; see below, p. 113.

γ (especially β) tend to become small and to disappear; ε is mostly present (small or absent in *P. callirrhoe*, fig. 10); ζ as a rule is absent, except as we have seen in *P. atalanta* ♀. In those that approach *P. cardui*, *i.e.*, the assemblage of species distinguished by Scudder* as "Neopyrameis," β & γ are tolerably conspicuous, ε nearly always absent, but ζ may be very large and distinct, as in most specimens of *P. huntera*. *P. gonerilla*, from New Zealand (fig. 11), has α—ε constantly and plainly present, their appearance being, however, modified by an invasion of blue, the meaning of which we shall see later.

A careful examination of the whole family *Vanessidæ* and allied groups shows that this series D, α—ζ has a very extensive range; though in passing away from the insects just specially referred to it in most instances soon begins to lose its distinctive and conspicuous character.

At first, however, the series is plain and recognisable enough. *V. io* (fig. 12) shows the whole set complete from α to ζ; α is here coloured pale yellow, and is modified in shape in order to form the outer part of the pale zone of the eye-mark; δ though preserving its relative size is elongated conformably with the outline of the same mark, and all the spots from β to ζ are invaded by a pale blue colour, the meaning of which, like the somewhat similar feature in *P. gonerilla*, will be considered later.

In *Araschnia levana* we have the same series; α, δ and ζ being the most constant members, while γ & ε are small or absent. In the dark form known as *A. prorsa*, however, all are usually present (figs. 13, 14).

Other well-marked cases of the complete or partial presence of the series are afforded by *Eurema zabulina* (α and δ), *E. kefersteinii* (α, δ, ε, sometimes γ, underside α—ζ), *E. dione* (α, [γ],† δ, ζ). In this latter case the spots α—ε on both upper and underside are silvery, while ζ is vertically elongated and transparent. The assertion that the window-slit in the centre of the fore wing in *E. dione* represents the minute white spot in the red band of the female *P. atalanta* may sound far-fetched and unlikely to be true, but to any one who will

* Op. cit., vol. i., p. 434.

† Sometimes absent.

compare the following—*E. dione*, *E. kefersteinii*, *P. huntera*, *P. atalanta* ♀, there will be no possible doubt of the correctness of the identification (figs. 15, 16, 17).

In *V. polychloros* (fig. 18), the spots of this series are of a reddish yellow, not very far removed from the orange-brown ground colour of the wing; nevertheless it is usually easy to identify α, β & γ. The rest of the series is less readily made out; however, in some specimens δ, ε and ζ are to be distinguished, and even a further member which we may call η.

V. urticæ, as we have seen, has α well developed and pure white in colour, but no further members of the series are present.

In *V. antiopa*, α and β are conspicuous and fused; γ and δ are faintly visible in some specimens, both on the upper and under side.

The same series of spots may, perhaps, be traced in the genera *Apatura* and *Limenitis*. If we compare the fore wing of *Apatura iris* with that of *Vanessa atalanta*, we cannot fail to be struck with the general resemblance of the pattern at the apex in the two cases, though whether the outer series of white spots in *A. iris* really corresponds with that in *V. atalanta* seems doubtful. Spots, however, more or less answering to β, γ and ε, are easily recognised in the male *A. iris*, while in the female α and δ are possibly present as well (fig. 19). There is, however, a certain departure from the *Vanessa* and *Pyrameis* type, in respect of the arrangement and relative size of the spots. Thus, β and ε are relatively large in *Apatura*, small in *Pyrameis*; moreover in *A. iris*, ε though preserving the same relation to the nervules of the wing as in *Pyrameis* and *Vanessa*, seems as far as the pattern is concerned to have stepped into the place of δ.

In *L. sibylla* we find the series present in *A. iris* verging towards disappearance. It is not difficult, however, to identify α, and probably β and ε (fig. 20).

But the most interesting results in connection with this series follow from tracing it in another direction. The general uniformity of pattern in the genus *Argynnis* is well known, and at first sight it may seem that these insects present nothing that corresponds to this series of spots. If, however, *A. valesina*, the melanic variety of the female of *A. paphia* (which probably represents a

reversion to, or survival of, an ancestral type) be carefully examined, it will be seen that the arrangement of dark spots and pale ground colour near the tip of the fore wing closely corresponds with the pattern we have been considering in the *Vanessidæ* (figs. 21, 27; *cf.* figs. 1—4). This correspondence is strikingly brought out in some specimens by the creamy white colour of those pale areas that answer in position to the dead white band and spots in *P. atalanta*, the rest of the ground colour of the wing in *A. valesina* tending to a dusky olive.

The *Vaneśsa*-like character of this region of the fore wing, which as we have just seen is perceptible enough in the dark variety of *A. paphia* ♀, becomes remarkably vivid in the female of *A. niphe;* so much so, in fact, as to give the latter insect almost the general aspect of a *Pyrameis*, the underside especially suggesting that of *P. cardui*.* The resemblance does not depend only on the special points which we are now considering, but also on other features which will be noticed later. Confining our attention for the present to the series D, α—ζ, and making a careful comparison between *P. cardui*, *P. atalanta* ♀ and *A. niphe* ♀, we shall not be able to escape the conclusion that the series is exactly represented in this last insect, spot for spot (fig. 22). The only apparent exception is ζ, which is often absent from the upper side of *A. niphe*; on the under side, however, ζ is distinct and conspicuous, and in at least one specimen that I have seen (Hope Collection) it is faintly visible on the upper side as well. The comparison of *A. niphe* ♀ with other members of the genus *Argynnis* makes it clear that these light-coloured markings, which I have shown to be homologous with the white spots of the *Vanessidæ*, are merely an accentuation, as it were, of the general ground colour of the wing between certain of the dark spots which are so characteristic of the *Argynnidæ*.† If any doubt remains

* The aspect of *A. niphe* ♀ is no doubt partly the result of its mimicry of *Danais chrysippus*, but the special points named here and below (p. 101) can scarcely be affected by this fact. Moreover the resemblance as a whole is seen, on careful comparison with other Argynnids, to depend on the retention and intensification of true Argynnid characters, not (with the exception, perhaps, of the general shape of the wings) on the acquisition of new ones.

†The spot α is in one respect exceptional, as will be seen later (p. 101, note). It is to be observed also that the white spots in *A. niphe*

on this subject, it will be removed by a comparison of *A. sagana* ♀, *A. niphe* ♀, *A. valesina* and *A. diana* ♀ with *C. pantherata* and with the male of almost any *Argynnis* that it is most convenient to take; for instance, *A. adippe* or *A. paphia*. Putting together the results of the examination of all the insects that have been referred to, we recognise the areas between the dark spots of this region of the fore wing in the *Argynnidæ* (seen perhaps in their simplest form in *A. diana* ♀), as in most instances simply partaking of the usual brown ground colour of the wings (*A. adippe*, *A. paphia*, &c.), in other instances becoming somewhat specially marked out by an increase of paleness (*A. valesina*, *C. pantherata*), and in *A. sagana* ♀ and *A. niphe* ♀ assuming the character of a system of definite spots; which character becomes absolutely established in *Vanessa*, *Pyrameis*, *Araschnia* and *Eurema*, perhaps passes over in a modified form to the genera *Limenitis* and *Apatura*, and beyond these limits gradually loses its distinctive features and disappears. That the homology of the spots in all these cases (except the last) is perfect there can be little or no doubt for any one who will carefully examine the insects named. That the true line of development has been indicated in the above account is more open to question; it will, however, be seen in the course of this paper that the conclusion here arrived at is corroborated by other evidence.

2. *The submarginal chain of black spots with blue centres.*—I now wish to call attention to another feature in the colouring of the Vanessas and allied genera, and in the same way to make an attempt to trace its history. Near the anal angle of the hind wing in *Pyrameis cardui* there occurs a long narrow oval or crescentic black spot with a blue core or centre, the latter often showing signs of a division into two* (fig. 24, IV., 15). This spot is

are not absolutely distinct and circumscribed as in *P. cardui* and *P. atalanta*, but represent merely the central portions of small areas of unaltered ground colour into which they shade off with greater or less gradation of tint. In the genus *Pyrameis* the original ground colour has disappeared from around the spots a to ϵ, persisting only in the neighbourhood of ζ.

* This duplication of markings in the space between the submedian nervure and 1st median nervule is a common feature in both fore and hind wings of many species. See especially the blue spots in *V. urticæ* and *V. antiopa*. (Fig. 26, IV., 8, 15).

evidently the last term in a series of dark spots which forms a kind of inner border to the hind wing, there being a separate oval or diamond-shaped spot for each interspace between the nervules with the exception of the first two or three interspaces, in which the spots of this series are fused together (fig. 24, IV., 10—15). In *Pyrameis atalanta* the same blue-centred spot occurs in the same situation, and here again it is easily seen to be the last term in a series. But in *Pyrameis atalanta* the blue colour is not confined to this last term, for in most, if not all, specimens a definite area of blue, varying from a few blue scales to a well-marked patch, occupies the centre of the last spot but one. In the hind wing of *V. polychloros* we recognise at once the same submarginal series of spots, forming a complete inner border to the wing, each spot being now crescentic in outline, more or less fused with its neighbours, and the blue centre being found not only in the last one or two terms of the series, but in all of them except the first. The inner portion of the border of the fore wing in *V. polychloros* is formed by an evident continuation of the same series, visible also in the fore wings of *P. cardui* and *atalanta* (especially in *P. cardui*, under side), but in these latter cases somewhat obscured by the general coloration of the dark area of the wing. The series as a whole is that which we have already distinguished as IV., and the anterior portion of which forms the external boundary of the light-coloured series D, α—ζ. The conspicuous blue centres of the marginal spots in the hind wing of *V. polychloros* do not extend to the remainder of the series in the fore wing; nevertheless, in many specimens a few blue scales, quite inconspicuous, may be detected in the centres of IV., 5, 6 and 7. The same blue-centred chain of submarginal spots is very plainly visible in *A. levana*, especially on the upper surface. It occurs with great distinctness on the under surface of *A. prorsa*, and as a trace at the anal angle of the hind wing on the upper surface of the same insect, as also in *P. gonerilla* (fig. 25, IV., 15). Similar traces will be found at the anal angle of the hind wing in *E. kefersteinii* (best marked on under surface), and *E. dione*, in these cases the blue being reduced to a few blue scales, almost invisible to the naked eye. If we now turn to *V. urticæ*, and notably to *V. antiopa* (fig. 26),

we find the whole series of black submarginal spots with their blue centres complete and conspicuous. In the latter insect the crescentic outline of the spots, constant in *V. polychloros*, is mostly lost; and the spots become fused into a black band easily distinguishable from the dark chocolate colour of the general surface of the wing. An indication of the formation of this band by the fusion of separate members, each corresponding to an interspace, is preserved both by the crenated outline of the band and also by the blue centres, which in this species are large and conspicuous, their outline tending to become roundish or oval. The character of this submarginal band or chain of spots in *V. urticæ* bears a strong general resemblance to the same in *V. polychloros*, but in *V. urticæ* the distinct development of the blue centres in the upper wings marks an approximation to the condition in *V. antiopa*, which is also borne out in some specimens by a tendency towards complete fusion of the black spots, and the substitution of an oval or roundish outline for the crescentic shape of the centres.

Having now examined this system of blue and black markings in its almost evanescent condition in *P. cardui* and *P. atalanta*, and its state of greater development in *V. polychloros*, *A. prorsa* and *levana*, *V. urticæ* and *V. antiopa*, we will glance at two or three species closely allied to those mentioned, in which we shall find it represented under curiously modified forms; and then proceed to consider whether there is any evidence which may throw light upon its history.

If anyone will attentively examine the tip of the fore wing in *V. io* and compare it with the same region in *V. urticæ*, he will not be long in coming to the conclusion that the black crescent with its included blue area, which forms the outer portion of the ocellus in the former species, is the exact representative of the first part of the submarginal series which we have been considering in *V. urticæ*. It has been already pointed out how the spots D 2—5 are modified in *V. io* in order to help in the formation of the ocellus; the same applies to the present series. The first part of the series remains, the black spots being fused into the outer crescentic region of the ocellus. The blue centres are in some specimens quite separate, and easily to be identified with those of IV., 1—5 in *V. urticæ*; in many, how-

ever, they are fused, though seldom without retaining clear indications of their separate nature. Although the black constituent of this submarginal series (IV.) ceases to exist as a conspicuous feature behind the region of the ocellus, a relic of it can be detected in most, if not all, specimens in the form of a small dark patch just outside the spot ε, with a few blue scales to indicate the blue centre.

On page 94 attention was called to the invasion of the spots D β—ζ in *V. io* by a blue coloration. This affects both the spots themselves and the surrounding area of the wing, the scales composing the spots being not quite white, but a very pale blue, and the surrounding areas having scales of a blue nearly or quite as intense as that of the blue centres 2, 3, 4, plentifully mixed with other scales that merely present the bright chestnut of the general ground colour of the wing. This last feature in the colouring I shall speak of as the "blue shade." Its appearance in *V. io* irresistibly suggests the inference that it is due to an extension inwards of the blue of the centres of the fused submarginal spots, and this is put almost beyond doubt by a comparison of the corresponding region in *P. atalanta*, *P. huntera*, and *P. gonerilla*.

As has been before mentioned, the submarginal black band is quite recognisable in the fore wing of *P. atalanta*, though to some extent masked by the general black colour of the wing. We have seen that the blue centres are represented at the anal angle of the hind wing. But they are also represented in the fore wing, in some specimens with great distinctness, by two or three crescentic blue patches in the black ground colour, just outside the spots β, γ, δ, ε,—nearly the same situation, in fact, as the blue centres that survive in the fore wing of *V. polychloros*. These blue crescents, though usually well outside the white spots, in some cases approach them closely, and may even encroach upon δ, as in a specimen in the Hope Collection. We have only to turn to *P. gonerilla* to see this encroachment carried to a much greater extent. Here α is bordered with blue on its outer side, δ has a narrow blue band surrounding it, expanding externally to a broad blue margin; β, γ and ε are blue altogether.

I have only once seen anything of the kind in *P. cardui*,

but β and γ are nearly always blue, or at least edged with blue, in *P. huntera* and *P. myrinna*.

These cases would seem to support the suggestion already made that the "blue shade" in *V. io* represents an encroachment inwards of the blue of the centres of the submarginal series of spots.*

The question now arises whether we can trace the origin of this series of blue-centred spots, which we have seen in their full development and in their decline. It will be understood how keenly, when I was investigating this point, I sought among the Fritillaries for some indication of this blue-centred black border. Did there exist any species of *Argynnis* with blue round the margins of the wings? The clue to the solution of the question was supplied by the same species that is of so much interest in regard to the series D, α—ζ, viz., *A. niphe*. In this insect we are at once struck by the resemblance of the hind wing, both in ♂ and ♀, to that of *P. cardui*. The various series of dark markings are seen to correspond, spot for spot, and what is more interesting still, the submarginal portion of the wing shows a blue colour, best developed near the anal angle, which at once suggests the remnants of blue in *P. cardui*. The blue here does not, it is true, occupy the centres of the dark spots corresponding to those which form the submarginal series in *P. cardui*, but rather belongs to the ground colour between this series and one still further out, while externally comes another interrupted narrow area of blue ground colour before the black edge of the wing is finally reached. Still it is difficult to resist the conclusion that the blue in *P. cardui* is derived from a source indicated by the same colour in *A. niphe*, which indeed may have been effected by a spreading inward of the blue in the form of a shade which has afterwards been cut off, of which we have already seen an example in *A. prorsa*, or by the taking up of the outer row of dark spots in an attenuated form to make with the submarginal row a series of composite spots, the included blue ground colour becoming the centres of the series so made. This

* A similar extension inwards of bluish coloration from the series of blue-centred spots occurs on the under side of *A. levana*, both upper and lower wing. In *A. prorsa* (hind wing) this has become separated from the border, remaining as a small but distinct bluish patch.

last is most likely the true explanation, if indeed it is not put beyond doubt by a comparison of the anal angle, under surface, of *A. niphe* with the same region, either upper or under surface, in *P. atalanta*.

A comparison of the upper wings in *A. niphe* ♀ and *P. atalanta* gives a similar result. The submarginal series IV., very distinct in *A. niphe*, as in nearly all species of the genus *Argynnis* (fig. 31), is sometimes indicated in *P. atalanta* with tolerable distinctness, especially in its upper part, and is here seen to be bounded outwardly by an interrupted bluish area like that which in *A. niphe* bounds the same series of spots, though it is less conspicuous than in the hind wing. Further along the margin of the wing in *P. atalanta* the same interrupted bluish area occurs, and is here reinforced by a few scales of a more intense blue, which, as we have seen, spread inwards over the centres of the fused dark spots of IV., forming a "blue shade" like those already mentioned, and even reaching and encroaching on the white spots of series D, α—ζ. There can, I think, be little doubt of the substantial identity of series IV. in these two species.

A. niphe, as far as the arrangement of the black spots on the ground colour is concerned, is quite a typical *Argynnis;* and this particular series (IV.) runs in a very well-marked form throughout the genus (fig. 27, &c.). As far, then, as the first constituent of the series of marks we are considering is concerned, *i. e.*, the submarginal chain of black spots, we find it well-established in the Fritillaries, and persisting in a more or less marked degree in the Vanessas. There would seem to be little doubt that, as in the case of the series D, α—ζ, we have in *Argynnis* the generalised or ancestral and in *Vanessa* the specialised or derived form of the series, and this conclusion is supported by a further investigation into the history of the second constituent, *viz.*, the blue centres and shades. If we are right in tracing back the blue centres to the indications of blue ground colour in *A. niphe*, it becomes important to ask, What is the meaning of the latter?

Now it is a well-known fact that in very many species of *Argynnis* the two sexes differ in colour, one being much darker than the other. When this is the case the darker is invariably the female. The general darker appearance is partly due to the larger size of the black

spots (*A. paphia*), partly to an alteration in the general ground colour, which in these females shows an infusion of a dull olive of various degrees of intensity into the bright tawny ground colour characteristic of the male (*A. paphia, aglaia, adippe*, &c.). As is well known, a "melanic" variety of the female of the first-named species sometimes turns up, in which the whole ground colour is of a deep dusky olive, no trace of the usual tawny colour being visible. The females of some species of *Argynnis* are normally as completely destitute of the usual bright ground colour as these occasional melanic females, the prevailing tone in such cases being, similarly, a deep dusky olive or blue-green; the bluish tinge prevailing, *e.g.*, in *A. diana*, the greenish in *A. sagana*. In other species we see this dark blue or green ground colour confined to a particular area of the wing, *e.g.*, the tip of the fore wing and border of both wings in *A. niphe* ♀, the border of the hind wing in *A. niphe* ♂; the posterior and inner half of the hind wing in *A. pandora* and *A. childreni* ♀, the border at the anal angle in the hind wing of *A. childreni* ♂. It is significant that in all these cases, if the bluish or greenish ground colour is visible in only one sex, that sex is the female; if it is visible in both sexes, it prevails to a much greater extent in the female than in the male.

Prof. Meldola (in Weismann, *op. cit.*, vol. i., p. 8, note) quotes Mr. Wallace* as holding that the dark colour of many female butterflies is a character acquired for purposes of protection; but the facts to which I have called attention, more especially the occasional occurrence in at least one brown *Argynnis* of a melanic variety so closely resembling in coloration the normal female of other species, and the presence of traces of the same dark ground colour in some of the male Argynnids, would seem rather to point to the conclusion that at any rate in this group the dark blue or green is ancestral; preserved, no doubt, in many instances for purposes of protection, but in the first place deriving its origin from the progenitors of the race.

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* 'Contributions to the Theory of Natural Selection,' 1870, pp. 112—114. In the same author's 'Darwinism,' 1889, pp. 276, 277, the analogous sober coloration of the female in many species of birds is considered to be an ancestral rather than an acquired feature. I am not sure that Wallace's words as cited by Professor Meldola necessarily imply that the same may not be the case with butterflies.

The melanic females would then be instances of reversion or survival, and the whole aspect of the females of the genus would be a case of the well-known rule that in species where sexual dimorphism or "antigeny" occurs, the female most nearly approaches the ancestral type, the male being the more highly specialised form.* The nearest representative of the primitive *Argynnis* would thus seem to be the female of *A. diana*, and it is interesting to note that one of the earliest butterflies yet found in a fossiliferous deposit† belongs apparently to that species, or at least is not easily to be distinguished from it. The first step in specialisation we may imagine to have been already taken in *A. diana* by the lightening of the ground colour in certain places, leaving darker patches forming a chain of spots. A further extension of the same process would give us a form like the melanic *A. paphia* (*valesina*), or, if a marked accentuation of some of the lighter areas took place, the female *A. sagana*. The bright fulvous ground colour of the majority of Argynnids would then represent a still further advance in specialisation, affecting, as we should expect, chiefly the males; and in such instances as

* Scudder (*op. cit.*, vol. 1, p. 533) maintains that in these cases it is the *female* that departs from the general type, though he admits that this is "precisely the opposite conclusion to that reached by Darwin." He quotes the case of *Semnopsyche* (*Argynnis*) *diana* ♀ as an instance of complete departure from the ordinary colouring of the group, but makes no mention of such similar colouring as is visible in *A. sagana* ♀, *A. niphe* ♀, *A. valesina*, &c. The partial dark coloration of certain males he accounts for by saying that "in other cases the melanic feature has been superinduced upon the opposite sex" (vol. 2, p. 951). It does not, however, seem to me that he has given sufficient reasons for his view to ensure its general adoption; and indeed the following passage would not appear to be in accordance with his own opinion as elsewhere expressed:—"Some species, which we can hardly doubt have had a common ancestor, scarcely differ from each other excepting in the character of their antigenic peculiarities, and this accounts for the close resemblance of the females of allied species of Skippers" (Ib.). Surely this must mean that the males are the more specialised. A good instance of the preservation of an ancestral character by the female alone is afforded by the spot ζ in *P. atalanta* ♀, as noticed above, p. 93. With respect to the alleged mimicry on the part of *A. diana* ♀, which forms part of Scudder's argument, see note on pp. 105, 6.

† "*V. pluto*" of Heer, from the Oligocene of Radaboj, Croatia. Vid. Lyell, Elem. Geol., 1885, pp. 214, 5; Edwards, Butterfl. N. Amer., 1879, vol. i.

A. niphe ♂ and ♀, *A. childreni* ♂ and ♀, &c., we should recognise the last battle-ground between the rival tints, the old one holding its own longest in the female, and especially clinging to the region of the borders and anal angle of the wings.*

If this be the true account of the bluish or greenish areas in the wings of such species as *A. niphe*, and if this survival of the ancestral ground colour about the borders of the wings be the origin, as seems most probable, of the blue constituent of series IV., so constantly present in the *Vanessidæ*, we have in the whole history of this series of markings an interesting case of the revival and fresh employment of an almost obsolete feature; just as if an old weapon, rusty from disuse, were polished up anew and once more turned to account, not indeed for its old purposes, but as a piece of ornament. The history of the series D, α—ζ, we saw to be somewhat similar, inasmuch as they represent mere lighter areas of ground colour, seized upon as it were and turned to more distinctly decorative purposes. In the two cases the most probable lines of origin are seen to converge from the showy and highly specialised Vanessas, through such forms as *A. niphe* to the archaic and comparatively sombre female *Argynnis diana*.†

* Perhaps even in this diminished form still serving as a protection, by shading the insect off against its surroundings, when sunning itself in the usual manner of Argynnids.

† Scudder ('Butterflies of the Eastern United States,' 1889, pp. 287, 532, note, 718, 1802, &c.) asserts that the difference between the sexes in *Semnopsyche* (*Argynnis*) *diana* is due to mimicry; the female *A. diana* mimicking *Basilarchia astyanax* (*Limenitis ursula* of Doubleday and Westwood). "There can be no doubt," he says, "that *S. diana* is the mimicker, since it obtains its resemblance by departing from the ground colour not only of the opposite sex, but that prevailing in both sexes in the whole tribe of Argynnidi to which it belongs." I do not find myself able to concur with Scudder in this opinion, for the following reasons:—(1). The ground colour of *A. diana* ♀ does not widely differ from that of many other female Argynnids, e.g., *A. valesina*, *A. sagana*, and (for part of the wing) *A. niphe*. There is therefore no need to assume mimicry in order to account for it. (2). The habits of *A. diana* are not those of an insect protected by mimicry, it being, according to Edwards, "an exceedingly alert and wary insect." (3). The resemblance of the two insects is not close. *A. diana* is much larger than *B. astyanax*, and differs widely from it in shape. (4). On the other hand, there *is* a close resemblance, as pointed out by Doubleday and Westwood ('Genera of Diurnal

3. *The white band on the costal margin of the fore wing.*—Returning now to *P. cardui* and *P. atalanta*, we find another conspicuous mark near the apex of the fore wing besides those already noticed. This is the broad white band passing inwards from the costa at the junction of its outer and middle thirds, to which I have already given the distinctive letter C. No question can possibly arise as to the identity of C in these two species.

Lepidoptera,' vol. ii., p. 275), between *B. astyanax* and *Lærtias* (*Papilio*) *philenor*. This resemblance extends not only to markings and colour, but to form and size as well. It is noticed by Scudder (*op. cit.*, p. 287), but dismissed as insufficient to establish mimicry. (5). The genus to which *B. astyanax* belongs contains undoubted cases of mimicry in which the Basilarchias are the mimickers. This raises a presumption in favour of *B. astyanax* mimicking rather than being mimicked, which is strengthened by the fact that *B. astyanax* has scarcely the aspect of a typical *Basilarchia*. (6). In favour of the view that *B. astyanax*, whether mimicked by *A. diana* or not, itself mimics *L. philenor*, are the facts given by Scudder (vol. ii., p. 1251), on the authority respectively of Edwards and Doubleday, that the latter butterfly "has a strong and disagreeable scent," and that "its flights are rather low and not very powerful." It would therefore seem that *L. philenor* is specially protected, and that it would be advantageous to another insect, such as *B. astyanax*, to be mistaken for it. On the other hand, no reason is alleged by Scudder why it should benefit *A. diana* to be taken for *B. astyanax*, nor does he suggest that *A. diana* may be taken for *L. philenor*. (It should be stated that Scudder fails to verify the point as to the evil odour of *L. philenor*.) On the whole, therefore, it seems to me that the evidence of mimicry between *L. philenor* and *B. astyanax* is much stronger than that between *B. astyanax* and *A. diana;* and if, as Scudder thinks, the former is insufficient, *a fortiori*, the latter must be also. I should wish, however, to point out that even if it be conceded that *A. diana* ♀ is a mimicker, it does not follow that the ground colour was *acquired* for that purpose; it may merely have survived. Moreover, the spots of *A. diana* ♀ are those of a typical *Argynnis*. The blacking-in of the base of the wings internal to series II. has its counterpart in other American Argynnids (*A. cybele*, *A. nokomis* ♀, and especially *A. leto* ♀), and the only character that, so far as I know, is really peculiar to *A. diana* among its relatives is the large expanse of blue ground colour surrounding the spots of series III., which I admit to be like the corresponding feature in *B. astyanax* and *L. philenor*. Whether, therefore, such resemblance as exists between these insects be due to mimicry or not, I see no reason to doubt that *A. diana* ♀ is a near representative of the oldest type of the Argynnids, and so in all probability of the *Nymphalidæ* generally. I may add to the above that Mr. Wallace, in his lately published volume 'Darwinism,' 1889, p. 248, speaks unhesitatingly as to the mimicry of *P. philenor* by *L. ursula* (Scudder's *B. astyanax*), but makes no mention in this connection of *A. diana*.

They correspond exactly, and C is also recognisable with equal certainty in very many of the allied species, e. g., *P. huntera*,* *P. gonerilla*, *P. callirrhoe*, &c. (see figs. 5—11). In *Araschnia prorsa* and *levana* C is again to be seen, in the former as a conspicuous pale yellow band, in the latter as a portion of the light ground colour of the wing between the dark areas II. and III. A similar condition obtains also in *Vanessa urticæ* and *V. polychloros*, in both of which C begins on the costa as a yellow band, which as it passes inwards soon becomes merged in the general reddish brown ground colour, this happening earlier in *V. polychloros* than in *V. urticæ*. In *P. carye* C is distinct and circumscribed, and of the same colour as the general surface of the wing. A relic of C is visible in *V. antiopa*, and in *V. io* (fig. 12) the band is present and modified to form the pale zone of the inner side of the ocellus, being in this species of very nearly the same pale yellow as in *V. urticæ*. Many other allied forms (*e. g.*, the genera *Grapta* and *Eurema*) show C with greater or less distinctness, and it is interesting to observe that it passes over into the genera *Limenitis* and *Apatura*. *L. sibylla* and *A. iris* both exhibit it very plainly (figs. 19, 20). In these two insects it passes by one interspace further into the wing than in most specimens of *P. cardui*, but some specimens of the latter show a paling of the ground colour in the situation corresponding to this extension, which becomes more marked on the under side; and in European, though not in American, specimens of *V. atalanta* a small white projection is constantly present in the same place.† Can an origin be assigned for this band C with the same amount of probability as in the former cases? Again we look to *Argynnis niphe* ♀ for an answer to the question. In this insect C is as distinct and conspicuous as in any *Pyramcis* or *Vanessa*, and is plainly seen to be an accentuation of the ground colour between the chain

* According to Scudder (*op. cit.*, vol. i., pp. 430, 458) C is white in the male *P. huntera*, orange in the female. It is, however, white in the large majority of specimens that I have seen.

† This statement as to the difference between European and American specimens of *P. atalanta* is made on the authority of Doubleday and Westwood (*op. cit.*, vol. i., p. 204), quoting Stephens. A specimen in the Hope Collection, labelled as from Illinois, in this respect resembles specimens from Europe.

of spots II. and the series III. which comes next outside it (fig. 4). The same appears with equal vividness in *A. sagana* ♀, and is plainly enough, though less strikingly, visible in the melanic *A. valesina* (fig. 27). The tendency to a lightening of the ground colour in this particular region appears again in *C. pantherata* (fig. 28), in this instance the ground colour being brown, though not so bright as in most brown Argynnids. Turning to *Argynnis diana* ♀, we find C indicated by a simple clearing up of the ground colour between the dark patches of series II. and III.′, and thus the present line of probable origin is seen to point in the same direction with those before suggested.

Although in the great majority of cases C is not specially distinguished from the general ground colour, except in the neighbourhood of the costa, yet there are some exceptions which must be noted, as they are of special interest. The yellow patch (Cη, fig. 32) near the anal angle of the fore wing in *V. urticæ* belongs to this series, as also the yellow shade at the costal margin of the hind wing in the same species. These are both recognisable in *V. polychloros*, and the latter in *V. io* plainly contributes to the pale zone surrounding the ocellus of the hind wing. But perhaps the most striking development of this series occurs in *A. sagana* ♀, where several members of the series are picked out in pale primrose. In the hind wing of this species a broad band is thus formed, which at once suggests the band that crosses the hind wing in so many species of the genera *Apatura* and *Limenitis* (figs. 29, 30). That the band in *Limenitis* corresponds with that in *Apatura* will scarcely be questioned, and that the band in *Apatura* exactly coincides in position with Cθ—ξ in *A. sagana* ♀ will be evident on a comparison of the latter insect with *A. ilia*, in which the spots of series III. are persistent.* The apparent continuation of the same white band on the fore wing of *Apatura* and *Limenitis* would also appear to be the counterpart of Cε—η in *A. sagana* ♀, and we are thus led to conjecture that both *Apatura* and *Limenitis* may have taken their origin from a form like the present.

* As they are also in some other species of *Apatura*, *e.g.*, *A. celtis* and *A. clyton*.

4. *The dark area between* C *and* D.—Having traced C and D throughout many of the species of the group, we shall, of course, find it easy to identify the dark area included between C and D in the same insects.

On the upper surface of the fore wing in *P. cardui* and *P. atalanta*, this dark area simply partakes of the general black or dark brown of the ground colour of that part of the wing, and shows no tendency to break up into separate constituents.

In *V. io* the same area is easily recognised as forming the centre of the ocellus in the fore wing, and a part of it is here suffused with the ruddy chestnut of the general ground colour.

In *V. urticæ* this area somewhat resembles in shape the same area in *V. io*, but is sharply marked off from the red ground colour. *V. polychloros* shows us the same dark patch, in many cases breaking up into a chain of spots which run parallel with the submarginal series IV. and the hind border of the wing. Much the same appearance is presented throughout the genus *Grapta*, but in *Grapta c-aureum* we find the suggestion of a breaking up of the area into two lateral constituents by the inclusion of a patch of the ordinary ground colour just internal to D α. This resolution is faintly indicated on the under side of some of the species we have already noticed by a paling of the ground colour towards the middle of the patch. Turning now to the genus *Argynnis*, we find, as before, the same arrangement in a more simple and intelligible form. The dark area is completely resolved into dark spots, situated on the ordinary ground colour, and falling into two series, an inner and an outer. The outer series is clearly seen to be the first part of a chain of eight spots, running right across the wing to the inner border, generally parallel with series IV., but with a decided inwards curve opposite the middle of the hind border. This is the series I have named III. It is, of course, one of the most constant and characteristic features of the pattern of the ordinary Argynnids.

The inner constituent is a triangular or crescentic patch, usually an obtuse-angled triangle, with its base at the costa, and its apex pointing backwards and outwards. This I distinguish by the sign III′. (fig. 31, *cf.* 4, 27). It is generally large and well-marked in the

females throughout the genus *Argynnis* (including *A. sagana* and *A. niphe*) ; in the males it is smaller, often crescentic instead of triangular, and sometimes (as in *A. paphia* ♀), apparently on the point of disappearance. In *Clothilda pantherata* ♂ ♀ it is resolved into a series of three (sometimes four) dark spots, converging with III. 1—5 towards the middle point of series III. (fig. 28). The same condition obtains in *A. diana* ♀, except that here the dark spots are less sharply differentiated from the rest of the wing.

We see accordingly that the dark space between C and D in the genera *Pyrameis* and *Vanessa* forms part of a series. This series occurs in its least modified and most complete form in the genus *Argynnis*, where it consists of a chain of dark spots, in their origin undoubtedly, like series IV., survivals of the primitive dark ground colour (see *A. diana* ♀) extending the whole way across the wing nearly parallel to the hind border, and giving off in the interspace between the 3rd median and 2nd discoidal nervules an interior branch which reaches the costa separately (fig. 31, III., III′.).

In the genera *Pyrameis*, *Vanessa* and *Grapta*, the spots posterior to the point of bifurcation have generally disappeared, while the two branches III′. and III. are usually fused together with more or less admixture of the light ground colour* (figs. 1, 2, 3).

The question may suggest itself whether the two small black spots near the middle of the fore wing in *V. urticæ* (fig. 32, II. 6, 7) do not represent two terms of this series. They are clearly identical with the two larger spots in the similar situation in *V. polychloros* (fig. 33), and these again with spots constantly present in the genus *Grapta*.

If we examine the fore wing of a specimen of *V.*

* Before leaving the subject of series III. with its offshoot III′., we may notice that the first one or two members of III. show a strong tendency to approach and become fused with the corresponding members of IV. (clearly seen in figs. 4, 31). The interval between the fore part of III′. and III. thus becomes better marked than that between III. and IV., and it is this interval that gives rise to *a* in series D, which thus constitutes an exception to the general relations of its series. This is most clearly shown by *A. nerippe*, in which *a* is conspicuously picked out in white on the usual tawny ground colour of an ordinary *Argynnis*, and is well seen to belong to the interval between III′. and III.

polychloros in which resolution of III. is pretty well marked, we shall find the constituents of III., together with these two spots and the large spot at the anal angle of the wing, forming a regular series in the form of an S. Comparing such a specimen with any *Argynnis*, we shall be tempted to indentify this series as a whole with series III. in the *Argynnis*, the only conspicuous difference being that in the latter the curve is less pronounced. With regard to the large spot at the anal angle I have no doubt of the correctness of the identification. It exactly represents in *V. polychloros* the spot III. 8 in the Fritillaries. The two others, however, do not really represent III. 6 and 7 as they seem to do; but belong to another series, the history of which will be traced later. This is shown by a careful examination of *Grapta c-aureum*, in which the two spots corresponding to those in *V. polychloros* are plainly seen, while outside them come two minute but unmistakeable representatives of III. 6 and III. 7 (fig. 34). If any one doubts this, he has only to look at the underside, where he will find the whole of series III., with its branch III′., sharply indicated by small black dots, two of which coincide exactly with III. 6 and 7 on the upper surface, while the representatives of the other two spots in question lie well to the inside of the present series. A feature in *G. c-aureum* worthy of notice is the presence in III. 7 (upper surface) of a minute patch of blue scales (the import of which will be explained later), indicating that it is in series with the blue centred III. 8.

It is interesting to observe that, as shown by the case of *V. polychloros*, it is possible for a new series to be made up out of parts of two old ones.

Series III., like the already described series IV., extends into the hind wing, here constituting a chain of spots most usually five in number, occupying the five interspaces from the 1st subcostal to the 1st median nervule. These five spots I distinguish by the numbers III., 10—14. They are conspicuously present in *P. cardui* (fig. 24), both upper and under surface; in the latter situation appearing as extremely handsome ocelli. They are present but less conspicuous on the under surface of *P. atalanta;* on the upper surface of this species they are partly obscured by the prevailing dark

ground colour, but still can in most specimens be easily distinguished by a careful examination. In *V. urticæ* and *V. polychloros* they are absent from both surfaces, so also almost entirely from the under surface of *V. io*, where, however, in some specimens, vestiges of III. 10 and 11 can be traced. In the genus *Grapta*, the spots of this series on the upper surface, as a rule, are fused; and the series appears as an irregular brown band, darker than the general ground colour, but paler than the spots of another series (II.) which at present remains undescribed. On the under surface in this genus, the spots are often discrete and pretty easily recognisable; this is notably the case in *G. c-album*.*

In the genus *Argynnis* we find, as we should expect, the spots of this part of the series constantly present and very distinct, especially on the upper surface (fig. 31). Beneath, they may be conspicuous as in *A. adippe* and *A. lathonia*, where they are picked out with silver, present but somewhat faintly distinguished as in *A. paphia*, or modified into mere patches of green shading to the silver spots, as in *A. aglaia*. The series in *A. lathonia* is reinforced by the presence of III. 9 and III. 15, which in most species are wanting; and the under side of this insect gives perhaps the most complete view of the whole series that can be found in the genus. In *A. diana* the spots are present but small, in the male almost evanescent, and in both sexes absent from the under surface.

Two points of interest remain to be noticed before the present series is dismissed. The first is the relative size of the spots III. 10—14.

In the genus *Argynnis*, III. 12 is almost always smaller than the rest, it may even disappear altogether, as often in *A. adippe* ♂. In the genus *Pyrameis*, III. 11 and 14 show a strong tendency to exceed the average size. This is well seen on the under side of *P. atalanta* (less clearly in *P. callirrhoe* and *P. gonerilla*), and on both surfaces of *P. cardui*. In *P. huntera* the enlargement of these two members of the series becomes a very conspicuous feature of the pattern, the under side in this species often presenting III. 11 and 14 in the

* In *G. c-aureum*, III. is very well defined in the hind wing, where the spots composing it are blue-centred (see p. 114).

form of two large and very showy ocelli, while the rest of the series is almost or quite obliterated.

The conspicuous ocellus near the anal angle of the hind wing in *A. iris* (fig. 30) may very probably be identified with III. 14, as is shown by a comparison of the under side with that of *A. ilia*, in which most of the series is present.

The second point that remains for notice is the frequent occurrence of blue centres in the spots of this series. A large proportion of British specimens of *P. cardui* have a few blue scales in the centre of III. 14; in some there are distinct blue patches in the centre of both III. 13 and 14, while specimens of *P. kershawi*, from S. Australia, have conspicuous blue centres to these, and also to III. 12 in addition. It is interesting to remark that (so far as I have observed) those British specimens of *P. cardui* in which D ε is present, mostly have blue centres to III. 13 and III. 14 as well*; as we know that the presence of D ε is an ancestral feature, this would lead us to make further enquiry into the occurrence of these blue centres, in order to see whether they too have a history. Turning to the closely allied *P. huntera*, we find the blue centre well-marked in III. 11 and 14, while in *P. carye* we find the whole series in the hind wing blue-centred, with the exception of III. 10. In the very showy *P. gonerilla* of N. Zealand, III. 11—14 are conspicuously present on the upper side, each with a blue centre (fig. 25). *P. itea* has III. 12—14 provided with small blue centres, besides possessing a blue relic of IV. 15 at the anal angle of the hind wing. But the most interesting development of the blue-centred III. 10—12 occurs in *V. io*, where these three spots, without losing their separate identity, combine to form the ocellus of the hind wing. In many specimens of *V. io*, attentive examination of the hind wing will disclose the presence of the next member of the series, namely III. 13, in a rudimentary form, consisting in fact merely of a minute black patch, with a few blue scales in the centre, almost concealed by the long chestnut-coloured hairs that beset this part of the wing (fig. 35, III. 13). In the

* This, however, appears not to be the case with the British Museum specimen of *P. cardui* mentioned on p. 93, in which respect it differs from the Mortehoe specimen mentioned on the same page.

'Entomologist' (Vol. xxii. (1889) p. 218; and Plate VIII., fig. 8), Mr. South figures and describes a variety of *V. io*, in which III. 10 and III. 11 remain distinct as simple black blue-centred spots, like the same spots in *P. gonerilla*,—this again confirming the account of the homology of the ocellus just given. The condition is represented in fig. 36.* Whether other materials enter into the composition of the central area of the ocellus in *V. io* I do not feel certain, but the appearance of the three blue constituents, especially the doubling of the middle one, would suggest that perhaps the submarginal blue-centred band IV. (cf. *V. urticæ*) may have helped in its formation. I am, however, unable to bring forward any facts in support of this suggestion.

The blue centres to the spots of this series are not confined to the genera *Pyrameis* and *Vanessa*, but occur also in the allied genera *Grapta* and *Eurema*. In *Grapta c-aureum* not only are the spots in the hind wing blue-centred, but III. 7 and 8 (the former being rudimentary) in the fore wing are blue-centred as well. It will be remembered that this feature enabled us to decide upon the true position of the central black spots in the fore wings of *Grapta* generally, and so also of *V. polychloros* and *V. urticæ*. In *E. dione*, III. 13 and 14 have distinct blue centres.

It appears then, to summarise the foregoing, that the present series (III.) has a history broadly corresponding with that of the previously considered (IV.), existing in its more generalised condition among the Argynnids, and in a form specialised by alteration and partial suppression in the Vanessids. Unlike the blue centres of series IV., which we saw to have a continuous history from the original ground colour of the Argynnids, the blue centres of the present series would appear not to be traceable further back than to the common ancestor of *Vanessa*, *Pyrameis*, *Eurema* and *Grapta*. They represent an added feature.

5. *The dark area between* B *and* C.—On the costa of the fore wing of *P. atalanta*, internal to the white band which I have called C, and external to the red band the costal termination of which I have marked as B, we find

* Taken, by kind permission of Mr. South, from the 'Entomologist,' *loc. cit.*

a black area, continuous posteriorly to C with the black ground colour that pervades the whole region of the apex. This is clearly identical with the central of the three black costal patches in *Vanessa urticæ*, *V. polychloros*, and *Grapta c-album*, and is without difficulty also recognisable in *V. io* as the black claw-shaped mark which forms by its concave border the inner boundary of the ocellus (figs. 1, 2, 3, II.). On the underside of *P. atalanta* we find this surface diversified by certain bluish marks, of variable character, but on the whole tending towards a threefold division of the dark area in question. Turning to *Pyrameis cardui* and its immediate allies, we find no difficulty at all in identifying this area; and a glance at the under side of *P. cardui* or *P. huntera* enables us at once to recognise that here the threefold division visible in *P. atalanta* meets us again. The division between the outer and middle portion of the patch, however, is of far less importance than that between the middle and inner; and referring back to the upper side of *P. cardui* we see this latter division alone represented.

Of the two members into which this patch accordingly divides, the outer becomes merged in the dark ground colour of the apex, while the inner comes to an end near the origin of the 3rd median nervule, having enclosed the disco-cellular nervules in its course, and so having intruded a little way into the discoidal cell.* With these two landmarks to guide us, *viz.*, on the outer side C, and on the inner the disco-cellular nervules, we find it easy to mark out the corresponding area in the Argynnids (fig. 4). As we should expect, we find here resolution instead of fusion; the twofold division is in most cases very clearly marked; the outer division, that immediately bounding C on its inner side, being clearly the beginning of a series of spots† (II.) which runs through both wings, upper and lower, and being separated by a region of the lighter ground colour from the inner division (II.′) which, as in *Pyrameis*, just occupies both sides of the disco-cellular nervules (fig. 37).

Up to this point we have met with no difficulty in the

* This portion within the cell, however, belongs properly to another series (I).—*Vid. infra*, p. 118.

† Visible also on the under side of a specimen of *P. cardui*, from North America, in the Hope Collection.

investigation of this series, nor so far as the Argynnids are concerned does the least doubt arise with reference to the identification of series II., which occurs throughout the group just as universally as series III. and IV., and is traceable through both fore and hind wings with equal certainty * (fig. 37).

Nor, again, is there any room for doubt as to the presence of series II. in the hind wing of the genus *Pyrameis;* a comparison of *Pyrameis cardui*, *huntera*, or *myrinna*, with any *Argynnis* being conclusive on this point; though here the tendency towards fusion of the spots into a band is still more strongly marked than in *Argynnis*. The marginal region of the dark base of the hind wing in *V. urticæ* and *V. polychloros* similarly results from the fusion of series II.; and the same feature is readily recognised in *V. io*, forming the dark crescentic border of the basal portion of the hind wing adjacent to the ocellus. In *Argynnis sagana* ♀, the homologous feature is the dark portion of the hind wing just internal to the broad cream-coloured band; in all probability corresponding with the similar character in *A. iris* and *ilia*, *L. sibylla*, &c. The presence of the three series, II., III., and IV., in the hind wing in an almost unmodified condition gives this region in *P. cardui* a great resemblance to the same in the Argynnids (*cf.* figs. 38, 39).

But with regard to the remainder of the series in the upper wing, considerable difficulty attends at present any attempt to bring the *Vanessa* and Argynnid types into harmony with each other; and though some of the steps in the reasoning that follows will not be disputed, the argument as a whole is somewhat doubtful, and must not be taken for more than it is worth.

The three black spots in the hinder portion of the fore wing in *V. urticæ* are, as we have seen, certainly identical

* It is observable with regard to series II., as compared with III. and IV. in the Argynnids, that the spots of which it is composed (1) take a more zig-zag course across the wing, falling less easily into a regular series; (2) are themselves less circumscribed, often occupying the whole vertical space between two adjacent nervules, and thus tending, especially in the hind wing, to form a sinuous band rather than a chain of spots. In *A. diana* ♀ II. is present in its entirety, though not easily distinguishable from the general ground colour.

with the three similarly lettered in *V. polychloros* (figs. 32, 33; II. 6, 7, 8). The same three occur throughout the genus *Grapta;* in *G. c-aureum*, as has been seen, side by side with spots undoubtedly representing series III. (fig. 34). In *Grapta* we also get a representative of the spot at the anal angle of the fore wing in *V. polychloros*, which we have identified as III. 8. So far there is no difficulty. Now turning to *A. levana*, we may, I think, satisfy ourselves on a careful comparison with any *Grapta*, that II., 6, 7, and 8 are present, as well as III., 6, 7, 8; moreover, that there exist in *A. levana* two additional black areas in the angles between the submedian and median nervures, and between the 1st and 2nd median nervules, *i.e.*, in the roots of the 7th and 8th interspaces. These we may regard as in series with II′. 1—5, and may conveniently call II′. 7, and II′. 8 (fig. 40). The latter does not occur as a distinct spot in any *Grapta* with which I am acquainted; the former, however, is found in many species (e.g. *G. interrogationis*), also constantly in *V. v-album*, and sometimes in *V. polychloros* (as in a specimen in the Hope Collection, fig. 33). Having thus met with a tolerably generalised type in *A. levana*, and having used it to interpret this part of the series in the Graptas and Tortoiseshells, we shall find that we are able to trace from the same type two diverging lines, the first leading towards the genus *Pyrameis*, the other backwards, as we may suppose, towards the Argynnids. The best species to compare with *A. levana* for this purpose is *P. carye* (fig. 41), in which II. 6 and 7 will be found, forming a continuous band across the wing, connected in front with the anterior portion of series II., and behind with III. 8; while II′. 7 is seen to be similarly connected with II. 8 vertically; and also with II. 7 horizontally by a lateral streak following the course of the 1st median nervule. II. 8 is represented by a distinct but narrow patch connected with II′. 7, while a dark and not distinctly defined area at the root of the 8th interspace may stand for II′. 8. The passage from *P. carye* to *P. huntera* and *P. myrinna*, and through *P. kershawi*, *P. cardui* and *P. callirrhoe*, to *P. atalanta* and *P. gonerilla* is so easy that it is not necessary here to trace it in detail; the main features being the merging of II. 6 in the general dark ground colour, the paring down of II. 7 until it becomes

a mere projection on the summit of III. 8, the filling up of the valley between II. 7 and II′. 7, and (in *P. cardui* and *myrinna*) the disappearance or melting into II′. 8 of II. 8; to which must be added in *P. callirrhoe* the gradual overspreading of the wings by a dark ground colour advancing from the base, this feature reaching its highest development in *P. atalanta* and *P. gonerilla*.

If the identification of the spots already given be correct, they can of course be easily found in any ordinary *Argynnis*. The greatest doubt exists with reference to II.′ 7 and II.′ 8, which would seem to be usually absent. A spot corresponding to the former may, however, sometimes be seen in *A. lathonia* and *A. adippe* (as in specimens in the Hope Collection), while one in the position of the latter occurs normally in *A. lathonia* and *A. niphe*, and not infrequently in *A. childreni*, *A. idalia*, and other species of the genus. The present series is thus seen to constitute no exception to our general rule; and to be traceable as to its posterior portion with certainty, though as to its anterior with some doubt, from its earliest beginnings in such a form as *A. diana* ♀, where it is hardly to be distinguished from the general ground colour, through the more specialised Argynnids to the highly modified form it assumes in *Araschnia*, *Pyrameis*, *Grapta*, and *Vanessa*, the difficulty of identification in the latter genera arising, as in the former cases, partly from the suppression of some of the spots, and partly from the fusion of spots belonging to the same or different series.

6. *The markings within the discoidal cell.*—The last series of markings that calls for notice is that which occupies the discoidal cell in fore and hind wings, distinguished collectively as series I. These in the fore wing consist in their simplest form of five transverse marks, I. 1 being a small black patch in the angle between the subcostal and median nervures (fig. 4), I. 2 and 3 being united into a more or less complete ring (under side of *P. atalanta*, both sides of *A. adippe* and some other Argynnids, figs. 4, 42). It is probably the latter of these two marks that forms the innermost of the black costal patches in *V. polychloros*, *V. urticæ*, and *V. io* (figs. 1, 2, I., *cf.* figs. 42, 43). I. 4 appears in most Argynnids as a curved band with its convexity outwards; in *P. cardui* as a process from the summit of II.′ 7,

rarely reaching forwards to the subcostal nervure; in *P. atalanta* as a similar but blunter process, easily visible on the under side (fig. 42), but on the upper reduced to a mere irregularity of the dark inner boundary of the red streak. I. 5 is closely apposed to the disco-cellular nervules, with an occasional intercalated patch of lighter ground colour (as often in *A. adippe*), and forms the innermost portion of the middle dark costal patch in the Vanessas and Graptas.

The markings in the discoidal cell of the hind wing (I. 6—9) are normally four, or corresponding to I. 1, 2, 3 and 5. I. 6, like I. 1, occupies the angle between the principal nervures of the wing, *i. e.*, the subcostal and the median; I. 7 and 8 are often united into a more or less regular ring; I. 9, when present, consists of a narrow dark border to the disco-cellular nervules (fig. 44). These markings are, as we should expect, best seen in the Argynnids; in the Vanessas they are mostly merged in the dark ground tint that pervades the base of the wing. I. 6, 7 and 8, however, may be distinguished on the under surface of *V. polychloros*, *V. urticæ*, *V. io*, and other species.

7. *Phylogenetic conclusions.*—It now remains to put together the results of the preceding investigation, and to draw from them what conclusions seem possible as to the phylogeny of the forms examined.

It would appear, then, that all the lines which we have been able to trace converge in the direction of a dark olive or blue-coloured Argynnid like the female of the recent *A. diana*.* Possibly, were we able to go back further still, we should find a type in which the dark coloration was absolutely uniform, as it is over the basal region of the wings in *A. diana*, no differentiation into ground colour and spots having yet taken place. From such a type as the last mentioned, the earliest step in advance would be taken by the lightening of the ground colour in patches between the nervures, the original dark tint remaining as ill-defined streaks and

* "The stem-form of the *Nymphalidæ* must have possessed a caterpillar approximately of the form that is now presented to us by *Acræa* . . . *Acræa*, the *Heliconinæ*, *Argynnis* still remain in this stage of development." W. Müller, "Südamerikanische Nymphalidenraupen," Zool. Jahrbücher, Bd. i., p. 621. This is confirmatory of the primitive character of *Argynnis*.

spots between the lighter patches. This, as we have seen, is exactly the state of things now existing in *A. diana* ♀; and a consideration of this and other species (*A. idalia*, *A. leto*, &c.) will lead us to the conclusion that the process of differentiation began at the hind border of the wings, and has gradually extended inwards towards the body. Thus in *A. diana* ♀, we find the series of dark spots IV. and III. already distinguishable, though not yet well-defined, while II. is just emerging into separate existence.*

The four normal series of dark marks having thus been made distinct, as, for instance, in *A. paphia* var. *valesina*, we find in the next place a very general alteration in the pale areas of the ground colour between the spots. This loses its dull olive or bluish tint and becomes bright brown, as in nearly all Argynnids, the spots at the same time becoming, as a rule, smaller and more sharply defined. The original ground colour, however, clings to the females of certain species, and even, though in a less degree, to the males. Among the female Argynnids which retain the primitive ground colour, there occurs the very striking form *A. sayana*, in

* Scudder (*op. cit.*, vol. i., pp. 513—515) advances the view that the dark coloration in butterflies began as a dark border to the wings, spreading inwards and breaking up. It does not appear from the passage cited whether Scudder would consider the spots in the Argynnids to have directly arisen in this way, though his language would seem to suggest such a conclusion. I myself believe the balance of probability to be in favour of the view taken in the text, for the following reasons:—(1). Other evidence seems to show that the darker Argynnids are the older. (2). The general prevalence of a dark colour at the *base* of the wings even in brown Argynnids indicates that this at least is an ancient feature. (3). The spots in series II. seem by their shape (*vid.* p. 116, note) to bear traces of their latter differentiation. Such species as *A. lathonia*, in which the spots of series II. are distinct and circumscribed, like those of series III., we should on other grounds consider as the more highly specialised members of their group. Higgins ("On the Colour-patterns of Butterflies," 'Journal of Science,' 1868, pp. 323—329), suggests that the arrangement of the dark markings depends on that of the nervures, from the immediate neighbourhood of which they appear always to take their rise; while the lighter ground colour of the wing, which may be more or less affected by a "blush," is independent of the nervures. He makes, however, no attempt to show any reason for the alleged connection between nervures and dark colouring. As a matter of fact, both kinds of markings, whether light or dark, may either follow the nervures or be independent of them.

which, while all the dark series keep their normal places, an entirely new effect is produced by the still further paling of the ground colour in certain situations, especially between II. and III., or that region of the wings which we have denoted by C. In this way definite light-coloured bands are produced, which may readily suggest the source whence the groups represented by *L. sibylla* and *A. iris* respectively may have derived their characteristic pure white markings, the correspondence of which with those in *A. sagana* can scarcely be accidental.* In the neighbourhood of the brown Argynnids we find the slightly divergent form *C. pantherata*, which in the breaking up of the patch of original ground colour III′. marks a point of specialisation not reached by any true *Argynnis*, while its somewhat dull ground colour, and the peculiar accentuation of the costal portion of C and D, relating it to *A. valesina* and *A. diana* ♀, would seem to indicate its early separation from the Argynnid stem. This accentuation of C and D is carried to a much greater extent in *A. niphe* ♀, one of those transitional species in which we see the old and new ground colour fighting for the mastery. In this conspicuous and highly ornamental species we seem to have reached the point at which those butterflies called in the wide sense Vanessas quit the parent stem.†

* W. Müller (*op. cit.*, p. 622) considers that the group including *Limenitis* (which he names "Rippenbauenden") must find its root either among the *Vanessinæ* or the *Diademinæ*. This would remove *Limenitis* a step further off the Argynnids than my own suggestion would warrant, though it accords with my conclusion as to their relative antiquity. The position of *Apatura* Müller owns to be a puzzle (Ibid.). He inclines to remove it from the group of "Rippenbauenden," and somewhat doubtfully suggests its enrolment among the *Vanessinæ*, in the neighbourhood of the genus *Hypanartia* (*Eurema*). In favour of this it may be mentioned that (according to Scudder) the eggs of *Apatura* bear more resemblance to those of the *Vanessidæ* and even of the *Argynnidæ* than to those of *Limenitis*, and also that *Apatura* corresponds with many of the *Vanessidæ* in having 2 rows of spines instead of 4 on the under side of the last tarsal joint. (Scudder, *op. cit.*, vol. i., pp. 227, 8).

† The above statement as to the relative antiquity of *Argynnis* and *Vanessa* is in accordance with Müller's conclusions derived from a study of the larvæ. "A multiplication of the rows of spines from 6 [as in *Argynnis*] to 9, and the addition of the Ds and Ped rows has led to the forms that the *Vanessinæ* now show us." (*Op. cit.*, p. 621).

The earliest representatives of the group or subfamily *Vanessinæ* would seem before long to have separated into three divergent tribes, each pursuing a distinct path. In the first of these, that leading towards the genus *Pyrameis*, the decorative features of *A. niphe* are mostly preserved, and indeed, enhanced. The vivid contrast between the white portions of C and D and the surviving dark ground colour of the tip of the wing is rendered still more striking by the deepening of the ground colour to a dark brown or black, and the consequent blending of the spots belonging to the costal portion of III., III.′ and IV. into a uniform dark area, on which the white constituents of D, now formed into definite spots, tell out with much effect (*P. cardui*, &c.). The newer and lighter ground colour is now sharply marked off from the older and darker, instead of gradually passing into it, and is, moreover, itself brightened up, especially in the anterior portion of the fore wing, into a fresh salmon colour, which in the most highly specialised members of the genus is further transformed into a brilliant scarlet (*P. atalanta* and *gonerilla*). The relics of bluish ground colour round the margin of the wings as in *A. niphe* are awakened into greater brilliancy and used in combination with the spots of series IV. to form an extremely handsome border to the wing. This feature, though from its presence in all three of our diverging subgroups we must suppose it to have belonged to the "Protovanessa," or common ancestor of the three, is in *Pyrameis*, as we have seen, already on the wane, remaining chiefly in the neighbourhood of the anal angle of the hind wing, and in some species contributing a blue infusion to the spots of series D. On the under side it persists, though in reduced splendour. It would seem also probable that the "Protovanessa" was furnished with blue centres to the spots of series III., persisting in *P. gonerilla*, *P. kershawi*, *P. terpsichore*, *P. carye*, and (sometimes) *P. cardui*. The correspondence described in detail on p. 117 between the remaining marks of *Pyrameis* and those of *A. levana* tends to the conclusion that *P. carye* is perhaps the *Pyrameis* that comes nearest to the "Protovanessa," and from this species as a central point it is easy to trace in one direction *P. terpsichore*, *P. huntera*, and *P. myrinna*; and in the other direction, *P. kershawi*, *P. cardui*, *P.*

callirrhoe (*P. indica*), *P. atalanta*, and *P. gonerilla*.* It is worthy of notice that *P. gonerilla* preserves the blue of III., which has been lost by *P. atalanta*, *P. callirrhoe*, and to a great extent by *P. cardui*, and that *P. atalanta* and *P. gonerilla* both preserve D ε (*P. atalanta* ♀, also D ζ), which spots have with rare exceptions vanished from *P. cardui* and *P. kershawi*. D ζ is found in all the three species of the group headed by *P. terpsichore*. It is also interesting to note the different origin of the black ground colour on the inside and outside respectively of the scarlet streak in *P. atalanta* and *P. gonerilla*. That on the outside is a survival in an intensified form of the original dark colour of the primitive Argynnid, that on the inside is a new feature seen for the first time in *P. callirrhoe*, this part of the wing having in the history of the species been dark, light, and dark again. From the stem leading off from the "Protovanessa" towards the genus *Pyrameis* is emitted the branch represented by the genus *Eurema* (*Hypanartia*). *E. zabulina* bears a strong resemblance to *P. carye*, especially on the under side. *E. kefersteinii* is in some respects intermediate between *E. zabulina* and *E. dione*, this latter being probably the most highly specialised of the genus, though retaining series III. with its blue centres in the hind wing.

The second of the three lines diverging from the "Protovanessa" is that followed by the genus *Araschnia*, the single species composing which presents in a remarkable form, as is well known, the phenomenon of seasonal dimorphism. It is not necessary here to recapitulate the analysis of the markings of *A. levana*, which showed this form to be in some respects intermediate between the present members of the genus *Pyrameis* and the Argynnids; or to do more than mention two other features in which *A. levana* reproduces the characters of

* Prof. Meldola ('Weismann's Studies in Theory of Descent,' English ed., 1882, vol. 2, p. 447), arranges the genus *Pyrameis* in a somewhat different manner, as follows:—*P. atalanta*, *dejeanii*, *callirrhoe*, *tammeamea*, *myrinna*, *huntera*, *terpsichore*, *carye*, *kershawi* and *cardui*. It appears to me, I confess, that the transition from *P. cardui* to *P. atalanta* through *P. callirrhoe* (*indica*) is complete, and that the continuity is broken by the interposition of *P. huntera* and *myrinna*. I am unfortunately not acquainted with *P. dejeanii*.

the common ancestors of the group, *i. e.*, the blue-centred series IV. and the white spots of series D. In this last particular the form *A. prorsa* comes nearer the ancestral type than *A. levana*; in all other respects, however, it bears marks of higher specialisation, and it is worth notice, as a confirmation, that Weismann* concludes on quite other grounds that *A. levana* is the older form.

The last line leads off through the genus *Grapta* to *Vanessa polychloros*, *urticæ*, *ichnusa*, and *milberti*, no doubt in the order given by Prof. Meldola.† The nearest approach to the "Protovanessa" among the Graptas is furnished, I believe, by *G. c-aureum*. This interesting form by its aspect at once recalls the Argynnids, both in colour and markings. As we have seen, it is characterised by the possession of several ancestral features, for example, the co-existence of series II. and III. in the hinder part of the fore wing, and the presence of blue centres in the latter throughout its extent. The affinity of *Grapta* to *Araschnia* is suggested by the markings (especially the occurrence in both of the series II.'), and is supported by the fact that the larvæ of both genera are distinguished among their allies by the occurrence of two spines on the head. The blue centres of series IV. in *V. polychloros*, improved upon in *V. urticæ*, are an ancestral feature that has mostly disappeared from the upper side of the Graptas, though still, as a rule, recognisable beneath. A noticeable characteristic of the present group is the gradual disappearance of series III. Well represented in *G. c-aureum*, where it preserves the blue centres of the "Protovanessa," it loses in the rest of the genus its distinct character; in *V. polychloros* it cannot be traced in the hind wing or in the middle of the fore wing; while in *V. urticæ* the outermost costal patch is its only remaining vestige.

Somewhere probably near the beginning of this third stem came off a branch, which ends in the two species *V. antiopa* and *V. io*. Both of these forms preserve the ancestral blue-centred black border; *V. antiopa* in completeness, *V. io* partly as a constituent of the ocellus of

* 'Studies in the Theory of Descent,' vol. i., p. 19.

† "*C-album*, *i-album*, *v-album*, *faunus*, *comma*, *dryas*, *polychloros*, *xanthomelas*, *cashmirensis*, *urticæ*, *milberti*." Weismann, 'Studies, &c.,' vol. ii., p. 447, note.

the fore wing, partly as an almost invisible rudiment. The latter species preserves series D in a conspicuous form, to which, indeed, it owes much of its beauty; and it also bears another, though less ancient, mark of descent in the presence of series III. with its blue centres in the hind wing; this again partly appearing as the finely-developed ocellus, partly existing only as a rudiment, which cannot be seen without the closest examination.*

In conclusion, it need scarcely be said that the present paper makes no claim to completeness. Fresh lines of investigation which continually offered themselves during its progress have had to be deliberately passed over in order to keep the subject within bounds. I do claim, however, to have broken new ground in a wide field. And while I hope to return to this field on a future occasion, whether with the present or other families, I trust that what I have now put on record may be taken as a contribution towards a natural and rational arrangement of the Argynnids and *Vanessidæ*.

I have to offer my grateful acknowledgments to Prof. Westwood for his kindness in allowing me free access to the Hope Collection at Oxford under his charge, and in affording me every means for working in his department, together with other help of various kinds. I am also under great obligations to my friends Dr. G. B. Longstaff, Mr. W. Hatchett Jackson, and Mr. E. B. Poulton, F.R.S., for much information and many valuable suggestions, for which I here wish to tender them my sincere thanks.

Postscript.

Since the foregoing paper was written a communication by Van Bemmelen† has appeared in the 'Tijdschrift der Nederlandsche Dierkundige Vereeniging,' in which the author gives the result of some observations made

* It is worth noting that the blue of the ocellus of the fore wing and that of the hind wing have different origins. The latter traces back to the "Protovanessa" only, the former to the ground colour of the primitive Argynnids.

† "Ueber die Entwicklung d. Farben und Adern a. d. Schmetterlings Flügeln." 'Tijdsch. d. Nederl. Dierk. Vereen.,' 2nd serie, Deel II., Aflevering 4, Leyden, 1889, pp. 235—247.

by him on the pupal and imaginal wing-patterns of *V. urticæ* and *P. cardui*, with the view of gaining some information on the question of their phylogeny. He finds that the wings in the pupal condition show a colour-pattern which differs in several respects from that finally assumed, and that the costal band and white spots in *P. cardui* (my C and D) are survivals of this primitive pattern. The series D in *P. cardui* originally extended as far as the interspace between the 1st and 2nd median nervules (my 8th interspace). He notices the occurrence of a variety of *P. cardui* possessing a fifth white spot (my D ε), and also speaks of a variety of *P. atalanta* with a small white spot in the middle of the red band, not seeming to be aware that this spot (my D ζ) is normally present in the female. Having drawn attention to the corresponding five white spots in *V. io*, he points out that the under side shows the rest of the primitive pattern as seven white dots in the dark ground colour; and that the under surface of the hind wing also possesses minute black dots representing spots which have disappeared from the upper surface, unless the ocellus results from the combination of the two anterior of them.* The fore wing in *V. polychloros* may also show the primitive row of light-coloured spots; the first two being united into a crescent shape, as in other Vanessas. This crescent, he proceeds (my D α), is the sole relic of the primitive row of spots in *V. urticæ*, *G. c-album* and *V. antiopa*; in the last-named, however, the next spot (D β) takes part in the crescent as well. The series is also present in *A. levana* and *prorsa* (*op. cit.*, pp. 238—240). The author points out that the development of the wing-pattern in *V. urticæ* confirms the conclusions derived from the same in *P. cardui* and from the imaginal forms cited. He describes the primitive pattern in the pupa of *V. urticæ* as possessing

* V. Bemmelen does not clearly distinguish between series III. and IV., and I am not certain as to the identification of his dots on the under surface of the hind wing. Of the two series, IV. is by far the more easily recognisable on the under surface of the hind wing in *V. io*, being represented by large crescent-shaped spots, some of which may even have blue scales in their centres. As I have shown above (p. 113), the ocellus of the hind wing includes *three* not *two* members of series III., and the fourth is represented by a rudiment (fig. 35, III. 13), of which V. Bemmelen makes no mention.

the spots of my series D, which, however, disappear (with the exception of the first two) as the final pattern becomes established; and notices that the permanent black spots in the median interspaces (my II. 6 and 7) appear not in the place of, but on the inner (or midwards) side of the primitive light spots.

While entirely agreeing with Van Bemmelen as to the primitive character of the spots of my series D, I do not find myself able to concur with him in his conclusion that they are replaced or represented by the brown or black spots of the Argynnids (*op. cit.*, p. 240); nor do I consider that his opinion as to the primitive character of the markings in the *Danainæ* and *Satyridæ*, as compared with other *Nymphalinæ*, is fully borne out by the facts (ibid., p. 242). Nor again, for reasons given at length in my paper, can I fall in with the view that *P. atalanta* has on the whole undergone less alteration from the primitive condition than *P. cardui* (ibid., p. 239), though this is no doubt the case with regard to the spots of series D.

Van Bemmelen, in the course of his communication, refers to a paper by C. Schäffer,* in which the latter writer mentions that he has at present been disappointed in his hopes of arriving at some phylogenetic results from a comparison of the final with the primitive pattern in the wings of butterflies, in the manner of Weismann's work on the colours of lepidopterous larvæ, and Eimer's on the colours of vertebrates. But the earliest stage observed by Schäffer (who also made use of *V. urticæ* for this investigation) seemed to him to show already most of the characters of the final. He makes, however, in this connection, at least one remark of interest, *viz.*, that the pattern of the hind wings is longer in developing than that of the fore wings, and in this he is confirmed by Van Bemmelen. He moreover suggests that the submarginal band results from the fusion of separate spots, pointing (no doubt rightly) to its condition in *A. levana*, *P. cardui*, *P. atalanta*, and *P. gonerilla*,† and

* "Beiträge zur Histologie der Insekten." 'Zoolog. Jahrbüch.,' iii. (1889), pp. 611—652.

† With regard to *P. gonerilla*, Schäffer does not seem to have noticed that the distinct spots in the hind wing do not belong to the submarginal band (IV.), but to the next series (III.), as fully shown in my paper. The only indication of the submarginal band

the occasional signs of separation in *V. urticæ* and *V. polychloros* in support of this conclusion. Van Bemmelen holds the opposite opinion, considering an uninterrupted band in this situation more primitive than a series of spots. I need not here repeat my own conclusions on this matter, as they are sufficiently expressed in the course of the present paper.

Another recent treatise, mentioned by Van Bemmelen,* I have unfortunately not as yet been able to see.

Explanation of Plates I., II., & III.

PLATE I.

Fig. 1. *V. urticæ.*
2. *V. io.*
3. *P. atalanta.*
4. *A. niphe.*
5. *P. cardui.*
6. *P. atalanta* ♂.
7. *P. atalanta* ♀.
8. *P. cardui*, var.
9. *P. huntera.*
10. *P. callirrhoe.*
11. *P. gonerilla.*
12. *V. io.*
13. *A. levana.*
14. *A. prorsa.*
15. *E. zabulina.*
16. *E. kefersteinii.*
17. *E. dione.*
18. *V. polychloros.*

on the upper surface of the hind wing in this species is the blue relic of IV. 15 (see fig. 25). The rest is merged in the general dark ground colour.

* Eimer, 'Die Artbildung und Verwandschaft bei d. Schmetterlingen,' Jena, 1889.

PLATE II.

Fig. 19. *A. iris* ♀.
20. *L. sibylla.*
21. *A. paphia*, var. *valesina.*
22. *A. niphe* ♀, under side.
23. *A. diana* ♀.
24. *P. cardui*, var.
25. *P. gonerilla.*
26. *V. antiopa.*
27. *A. paphia*, var. *valesina.*
28. *C. pantherata* (series III. and III.′ shaded).
29. *A. sagana* ♀.

PLATE III.

30. *A. iris* ♀.
31. *A. paphia* ♀.
32. *V. urticæ.*
33. *V. polychloros.*
34. *G. c-aureum.*
35. *V. io.*
36. *V. io*, var.
37. *A. adippe.*
38. *P. cardui.*
39. *A. paphia.*
40. *A. levana.*
41. *P. caryc.*
42. *P. atalanta*, under side.
43. *V. polychloros*, under side.
44. *A. adippe.*

In all the figures the same letters and numbers stand for the corresponding markings, as fully explained in the text (see pp. 91, 92); *m*, median nervure of fore wing; m, do., hind wing; *sc*, subcostal nervure, fore wing; sc, do., hind wing; *b*, blue.

Each series (except A and I) has, for convenience, been considered to consist normally of 15 members, 8 in the fore wing, 7 in the hind wing, and the interspaces have received corresponding numbers. If it be borne in mind that the spaces between the median and submedian nervures in the fore wing and hind wing are invariably numbered 8 and 15 respectively, and that the others are numbered in succession from them, there will be no difficulty in using the system, though a slight want of correspondence between spaces and spots occurs near the extreme tip of the fore wing which may occasionally make it necessary to refer to the branches of the subcostal nervure by their separate names.

IV. *Systematic temperature experiments on some Lepidoptera in all their stages.* By Frederic Merrifield, F.E.S.

[Read December 4th, 1889.]

Plates IV. & V.

The experiments made last year on the effect of temperature upon some Lepidoptera in various stages suggested so many points for further investigation that I determined to pursue my inquiries in a more systematic way this year. Therefore, instead of sending pupæ away to be iced, I provided myself with a refrigerator, in which I ascertained that the temperature ranged during the summer from about 39°, when freshly filled with ice, to about 55° (or even higher in warm weather) when most of the ice had melted; 47° was about the usual summer temperature; in spring and autumn the temperature was sometimes below 39°, and I think about 43° was the average in these seasons. This refrigerator temperature I speak of hereafter as "cool." Inside the refrigerator, however, I had an ice-box, where the temperature was uniformly 33°; this is where I kept the insects spoken of as "iced." I had, besides, two forcing-boxes, and the "forcing" temperature must be understood as about 80° unless otherwise stated.

I had two main objects in view; one to find what exposure to a low temperature could be borne in the different stages, the other to ascertain the effect of temperature, applied in stages anterior to the last, on the colour and markings of the perfect insect, and incidentally I hoped to throw light on some other questions.

As to the first object in view, I hoped the experiments might throw some light on the capability of the insect to pass the season of winter in some different stage from that in which it is now passed. It is well known that

Lepidoptera may hibernate in any of the 4 stages—egg, larva, pupa, or imago; and I wished to ascertain whether those experimented on could be made to hibernate in a stage normally passed in a warmer period of the year.

It is in one or other of the two inactive stages—those of egg and pupa—that I believe the majority of the Lepidoptera, in countries where there is a real winter, pass the cold period of the year, during which for most of them neither food is to be had for the larva nor flowers for such perfect insects as are attracted by them; but the cases in which hibernation takes place in one or other of the two active stages—those of larva and imago—are common, and the capability of passing the winter in a different stage from that in which it has habitually been passed, especially if an insect has a capacity for becoming double-brooded, would, it has been suggested, be a means by which it could adapt itself more readily to the great changes of climate to which the species must have been subjected in past ages. I began with the

Egg Stage.—I believe it is a common opinion that eggs which are usually exposed only to a summer temperature will generally bear severe and protracted cold without injury to their vitality.

Referring to Tables I. and II. appended for details of the experiments made on this point, I limit myself here to a statement of results. In the case of *illunaria* spring-laid eggs, iced in the central "red" stage, 28 days began to affect their vitality, and none hatched after 60 days' icing. The case was worse with spring-laid eggs of *illustraria*, none of which survived 42 days' icing; and some *illustraria* summer-laid eggs were no better. In all the experiments up to 60 days' exposure, and I think beyond that period, nearly all the eggs, after being removed from the ice, matured so far as to admit of the formation of the young larva, which could be seen through the transparent shell; the failure was a failure to hatch.

A curious result happened with some spring-laid *illustraria* eggs iced before they had turned red; two of them became blackish while in the ice (where the eggs were kept for 17 days), and hatched the day they were taken out of the ice, or the next day, the rest remaining

red for several days, and hatching in from 11 to 13 days after removal from the ice. These are strong examples of individual character manifested at a very early age. The eggs seemed in all cases uninjured by a temperature of 80°—90°, their development being accelerated by it.

Larval Stage, growing Larvæ.—(1) *Exposure to low temperature.*—Larvæ of *illustraria* in their first skins not exceeding 6 days in age were iced, and all were dead in 20 days; some 30 of the same age, which were cooled, scarcely seemed to grow, but two lived rather more than 63 days. Some that were iced in their second skins were all dead in 21 days. Some that were cooled in one or other of their two last skins grew slowly, four of them spun-up, one as late as the 58th day, and two pupated. In all the cases of cooling the larvæ were supplied with food, which was slowly eaten; in the case of the iced larvæ food did not seem necessary. The experiments seem to indicate that the older larva is more capable of enduring a low temperature than is either the egg or the young larva, and as *illustraria* will live and apparently thrive, at least for a time, on dead leaves, it would seem that this species might hibernate as a larva in countries where the winter is a short one.

(2) *Exposure to a high temperature.*—*Illunaria, illustraria, autumnaria* (the old *alniaria*), and *alniaria* (the old *tiliaria*), will all bear a continuous temperature of 80°, or a little more, apparently without injury; but one of 90° to 100° is very injurious to them.

Larvæ and pupæ; effect of the temperature to which they are subjected on the colour of the Moth. —The series of *autumnaria* exhibited to the Society last year indicated that temperature in the earlier stages materially affected the colouring and markings of the perfect insect, but left it uncertain whether that effect was produced in the larval or in the pupal stage. As then remarked, they seemed to show either that the larval period was the critical one, or that the colour of the perfect insect could be modified by exposing the pupa to very moderate differences of temperature. I determined this year, so far as possible, to clear up the point, and accordingly tried the systematic experiments I am about to describe. At the suggestion of Dr. Chapman, to whom I am indebted for a supply of eggs of both species, I experimented both with *autumnaria*, as a

species belonging rather to the warmer parts of Europe, and *alniaria*, as belonging more to the northern parts. This year, instead of mixing in equal proportions the eggs of several parents, so as to have a better chance of obtaining hereditary varieties, I limited myself to the eggs of a single pair, thus providing more exact means of comparison.

(1) *Preliminary cooling and icing experiments with* illustraria.—Those who are acquainted with Prof. Weismann's studies in heredity as translated and added to by Prof. Meldola, will remember that both in his experiments and in those of Mr. Edwards as recorded in that work, icing was generally not very efficacious unless applied to the pupa in an early stage, and that when so applied it was often fatal. Mr. Poulton's discoveries with regard to the pupæ and pupating larvæ of some of the butterflies showed that the effect of the surrounding circumstances was in them produced only at a still earlier stage, *viz.*, on the larva shortly before pupation. Though there seemed no great reason to suppose that the same principle would apply to pupæ protected by enclosure within leaves, it appeared desirable to test the matter, and to give the icing every opportunity for operating. My first experiments were designed to ascertain whether cold could be borne in the earlier part of the pupating and pupal stages, and, as regards pupæ which would ordinarily pass the pupal stage in summer, what *degree* of cold they would bear as fully-formed and hardened pupæ.

(i) *Icing larvæ just spun up.*—A first experiment with three larvæ of *illustraria* which had recently spun up, and were cooled for 16 days, showed that they had all pupated at that low temperature, and I then determined to try if such larvæ would pupate at the "icing" temperature of 33°. Accordingly (Table III.) I placed 8 in ice just after they had spun up. After 29 days they looked healthy and had spun a few threads, but had not turned; I therefore moved them to the "cooling" temperature, and then in about 6 days 4 of them pupated. These were afterwards iced as pupæ for 42 days; one died and the other three came out as perfect moths. The other 4 were after 8 days' cooling exposed to the ordinary temperature and dry air of the room—about 70° at this time—and all died in a day or two without pupating.

(ii) *Icing larvæ about to pupate* (Table IV.).—Eight which were within a few hours of pupating were iced, and all pupated in from 1 to 6 days, except 1 that died; they were kept in ice 28 days, after which 7 emerged as perfect moths.

(iii) *Cooling and icing pupæ in an advanced stage* (Table V.).—Eighteen were taken at from 7 to 11 days after spinning up, cooled for 2 days, and then iced. Six of them which were iced 28 days seemed quite uninjured, and all but 1 emerged. The other 12 were iced 60 days; nearly all of these failed to emerge or were cripples, 2 of them perhaps necessarily so from want of space to expand their wings.

Several pupæ from sleeved larvæ which were *just on the point* of emerging, but which I wished to keep back, were cooled, and emerged in perfect condition.

(2) *Experiments with pupating larvæ and pupæ of E. autumnaria and E. alniaria.*—The next experiments were tried with these species, which, so far as I know, are never in the natural state subjected to a lower temperature than that of an English summer, averaging about 64°. The experiments were more than preliminary, because they were also directed to ascertain the effect on colour, and therefore will be again referred to under another head, but are here referred to for the sake of indicating their effect on the vitality and healthfulness of those insects in different periods of the pupating and pupal stages. The details will be found in Tables VII., VIII., X., XI., XII., and XV., in the appendix, and the general results may be stated as follows:—Not the least injury seemed to arise from exposing the matured and hardened pupa, the soft green pupa, or the pupating larva to a cooling temperature; and one pupa of *autumnaria*, exposed to a temperature of 33° within 15 hours after pupating, emerged as a moth in good condition. In the case of *alniaria*, 1 that was kept 42 days at 33° came out in good condition, as did 2 that were a little older when iced, and were kept there 50 days. An exposure to 33° for 58 days or upwards proved generally fatal, and always more or less injurious, to *autumnaria*, but I am inclined to think *alniaria* would bear a much longer exposure. An exposure of *autumnaria* for 28 days to a cooling temperature—which must be a much lower one than this pupa is subjected to in its natural

condition—did not seem in the least injurious to it. Cooling the pupating larva, which at an ordinary summer temperature turns in 3 or 4 days, sometimes protracted the period to 14 days.

(3) *General results of preliminary icing experiments.*—These experiments show that not only is exposure to cold in the soft green condition not fatal or necessarily injurious to the species experimented on, but that the pupation of these summer pupæ will take place in some species at the low temperature of 33°, at which temperature therefore the necessary physiological changes must go on, though with extreme slowness. A curious proof is afforded of the harmlessness of the exposure to cold of soft green pupæ of *illustraria* by the exhibition I make of the pupa-cases of 3 that pupated at 33°, and the perfect moths which came out of them; it will be seen by inspection of the former that by lying so long in a soft condition, owing to the slowness with which they hardened at the low temperature, the pupæ became flattened on the lower side like sausages lying on a counter. There are indications that icing, not protracted, may be injurious to the summer pupa of *illustraria* in one stage, and in one stage only—*viz.*, that in which the pupa is going through the period which separates the central lethargic period from emergence; and it seems not injurious even here, if the exposure is limited to that very last pupal state of all, when the insect is fully formed in the pupa-case, and is only awaiting the usual time of day to emerge as a moth.

On the other hand, the considerable proportion of deaths and of cripples (see the Tables), and the irregularity of the period of emergence after the pupæ were taken out of ice or of the cooling temperature show that long exposure to cold of these *ennomos* pupæ, which have only a summer existence, is very injurious and disturbing to them.

(4) *Systematic experiments as to the effect of temperature on the colour and markings of the imago with* autumnaria.—These experiments were directed to several ends. The first was to ascertain beyond doubt whether it was in the larval or in the pupal stage that the low temperature operated, or chiefly operated, on the colour of the moth, and I think in this respect they have yielded very

clear results. I should premise that in describing the colours, I only mention the broad general effects. I am indebted to Mr. White for the more detailed description which I append. All the experiments were tried with eggs from the same parent.

The detail of the experiments will be found in the Appendix (Tables VI., VII., VIII., IX., X., XI.). Some were forced all through, others forced as larvæ, cooled as pupæ. Some were kept at the ordinary temperature all through; others, having been so kept as larvæ, were divided into two lots, of which one was forced as pupæ, the other cooled or iced for 28 days or more as pupæ. The result may be stated as follows:—*It was in the pupal state that the effect was in the main produced.* The *forced pupæ*, whatever the treatment of the larvæ had been, *invariably produced pale and comparatively spotless moths;* the *cooled or iced pupæ*, whatever the treatment of the larvæ had been, *invariably produced dark and much spotted moths.** Another point, suspected last year, was established—that a temperature of 63°, or even higher, is low enough to produce the well-known dark and spotted appearance. At the same time, the colouring of the moth seems *somewhat* affected by the temperature at which the larva has been brought up. The larval period in those that were forced was about 30 days, the pupal about 16, total 46 days; as against a larval period of about 68 days, and a pupal of about 25 days, total 93 days, in the unforced.

The moths from the forced pupæ are mostly smaller than the others, but this may be an accident, resulting, perhaps, from the circumstance that, owing to a relaxation of vigilance in the beginning of June, they were exposed for 3 days to a temperature of 90°—100°, which caused many deaths.

It will be seen that there is some individual variation, more particularly in the pupæ exposed to the ordinary

* There is little difference in general appearance between the moths from the cooled pupæ of forced larvæ, and the moths from the cooled pupæ of larvæ bred in the ordinary temperature; such as exists is perhaps partly owing to the fact that the latter were exposed generally to a lower temperature (the Refrigerator being colder at the time they emerged), and in some cases for a longer time. It is probably owing to this greater exposure that they have a less vigorous appearance, and include a large proportion of cripples.

temperature, and therefore some of the colouring must be attributable to individual and presumably hereditary qualities; but I do not think any one can look at the moths experimented on without recognising that practically the spotting or the spotlessness of *autumnaria* depends on the temperature to which the pupa is exposed, and that the temperature of an ordinary English summer is low enough to develop plentiful spotting, a difference between 65° and 80° counting for much more in this respect than one between 33° and 65°. So that a continental pupa imported young might be expected to develop the well known spotted appearance of the dark British form; in other words, the dark northern form is not, or at all events may not be, racial, but is the effect of climate on the individual pupa. In this respect the species seems to differ altogether from the double-brooded ones experimented on by Prof. Weismann and Mr. Edwards.

(ii) *With* alniaria (*formerly* tiliaria) (Tables XII., XIII., XIV., XV., XVI.).—I tried on a brood of these, all proceeding from the same parent, the same experiments as on *autumnaria;* but the results on the colouring, though tending in the same direction, were by no means so regular or so striking. This is, perhaps, partly because I bred only 8 of the female sex (which is the one which seems the most affected in this species); the same accidental raising of the temperature, which was so injurious to *autumnaria*, having been still more so to *alniaria*. In those that were forced the larval period averaged 27 days, the pupal 14 days, total 41 days; as against 62 days larval, and 23 pupal, total 85 days, in those that were unforced. The pupating larvæ and pupæ seem to bear cold better than those of *autumnaria;* I bred two perfect males after an exposure for 50 days to a temperature of 33°.

(iii) *With* illustraria.—It will, perhaps, be remembered that last year I showed some *illustraria* of which the summer pupæ had been iced 14 days, with the result that they manifested a very slight change of colouring in the direction towards that of the winter-pupated form. This year I determined to try the effect of exposure to an icing temperature, for periods successively increased by regular steps. I wished to see whether the colouring of the spring emergence could be

actually reached, and whether the markings also would change; and, if so, it struck me that it would be interesting to let the insect record, as it were for itself, in the markings of the preserved specimens, the steps by which the change in the markings was effected. Accordingly I brought up a brood from a single pair, from which I obtained 87 pupæ between 17th June and 3rd July. Fourteen were not iced, and previous experiments having led me to observe that there is often some difference in general colouring between the first and last parts of a brood, 8 of these 14 were taken from among those which pupated earliest, and 6 when about two-thirds had spun up. The whole of the 14 emerged in good condition, showing that I had fallen on a healthy brood; and showing also that it was a naturally dark coloured one, and therefore, perhaps, not so well adapted to show any darkening of colour as a lighter coloured set would have been. I had rather gathered, from experiments by others previously published, that about 28 days might be expected to produce full results; and therefore at first I was rather extravagant in the use of my materials, so that the numbers taken from time to time out of the ice had to be greatly reduced when experience showed that a much longer time was necessary to produce full effects in the case of this insect. The fortnightly withdrawals were as follows:—10 pupæ in 2 weeks, 12 in 4 weeks, 4 each in periods of 6, 8, 10, 12, 14 and 16 weeks, and 2 each in periods of 11 and 20 weeks; and I have 14 pupæ remaining, which I hope to spread, if necessary, over another 12 weeks, as this will make up the period of 7½ months, which is the full duration of the usual winter pupational period; this, however, does not seem necessary, as previous experiments lead me to believe that about 5 months is sufficient to produce the full colouring of the spring form under natural conditions, with an average temperature much higher than 33°.

(*a*) *Summer pupa of* illustraria; *effect of icing on vigour.*—Great as is the difference between exposure for two or three weeks to a temperature of 60°—70°, which is what this summer pupa in its natural state would sustain, and exposure of it, as in the experiments last described, to a temperature of 33° for 20 weeks, no injury seems to have been inflicted by this severe trial.

The deaths were very few, apparently not more than would have occurred if the pupæ had not been iced; there were no cripples, and the moths emerged with such perfect regularity that when the temperature in which the pupa was placed after removal remained about the same, I could always foretell within a day when the moth would emerge.

Effect on colour and markings.—As might have been expected, there is no change in size, but I am not sure there is not a slight difference in form caused by the icing, in a less rounded costa and a rather narrower wing. The difference in colour, however, is great, and in markings striking. In colour a general warm brownish hue with a considerable increase of darkness prevails. One of the most striking differences between the ordinary summer and spring form is in the shape of the outline of the dark inner portion of all the wings. In the summer form this outline approaches a *half circle*, but is very sinuous, with a conspicuous *break of continuity* where it passes from the anterior to the posterior wing, caused by curves inwards, and with several angles, of which the most salient is on the anterior wing, near the costa, with the outer portion of which it consequently forms an *acute angle*. In the spring form the dark inner portion approaches the shape of a *half hexagon*, the most salient angle being on the posterior wing, the other angles and curves being straightened out, an *obtuse angle* being substituted for the acute angle on the costa, and the outer edge of this dark part becoming *continuous* from the anterior to the posterior wing. This edge is also more blurred in the iced than in the uniced specimens. The first appearance of these changes in markings was in a female iced 28 days, and after 56 days they became frequent in both sexes, a male of 20 weeks' icing and two females of 18 weeks' seeming the most marked. As may be gathered, the change is not a gradual and regular one from fortnight to fortnight. Still there are some intermediate specimens that appear to show the process of transition—an interesting subject for investigation, which, however, I must leave to those who are better qualified to pursue it. I think it is of consequence to observe that the moth from the iced summer pupa, though there are changes causing it to bear a considerable general resemblance to

that which proceeds from the autumn pupa, is not the same in colour or in markings.

(*b*) *Autumn pupa of* illustraria; *effect of forcing, &c., on vigour.*—This converse experiment affords a striking contrast as regards its effects on the vigour of the insect.

Of 36 pupæ so treated in the autumn of 1887 (Tables XVI. and XVII.), only 12 emerged, and of these 7 were cripples, and only 5 perfect, or nearly so; and of these 5, 4 had been exposed some weeks after forcing to severe cold out-of-doors for about 5 weeks before the forcing was resumed.

Of another lot of 63 belonging to a not very healthy brood—for two-thirds of the larvæ died—18 were kept at the moderate temperature of about 60°, and of these only 4 emerged, 2 of them being cripples. The rest, 45 in number, were placed out-of-doors, and of these 32 emerged, only 3 of them being cripples.

Of the pupæ lent me by Mr. Jenner (as mentioned Ent. Soc. Trans., 1889, p. 92), being a brood which, except two individuals, laid themselves up for winter pupation instead of emergence in July, 26 were forced (Table XIX.), and only 13 of these emerged, of which 4 were cripples. This was a very healthy lot, for about 30 of the same brood, which were left to winter in a cool room, nearly all emerged in perfect condition.

All that were thus forced showed great irregularity in the time of their emergence, and they all seemed less thickly clothed with scales than normal specimens are, whether of the autumn pupa or of the summer pupa, the moths from which last are in general the most thickly clothed with scales.

The irregularity caused by forcing the autumn pupa at different periods is illustrated by Table XVIII., relating to a very healthy lot of 20 pupæ. This Table affords evidence that the irregularity is caused by forcing the autumn pupa at a time when it would naturally remain for months in the pupal condition, for the irregularity ceased when the forcing was postponed until the autumn pupa had been 4 months in that state.

Effect on colour and markings.—All the moths are intermediate in colouring and in markings between the summer and the spring emergence. Such as were exposed to cold during part of the pupal period are con-

siderably darker than the rest, and make the nearest approach in colouring, and I think, on the whole, in markings, to the spring emergence. In both classes those that were longest in pupa were, as a rule, darkest, even in the case of such of the pupæ as were never at a lower temperature than about 60°, which seems to indicate that retardation may be a cause of the difference in colour and markings.

(*c*) *Causes of the difference in the two cases.*—These results are so far in general accord with those recorded by Prof. Weismann as regards *A. levana*, and by Mr. Edwards as regards *P. ajax*, as to show a significant difference between the readiness of the summer pupa to bear and be influenced by winter conditions and the resistance offered by the autumn pupa to summer conditions. Prof. Weismann explains this difference by the hypothesis that the winter-pupating generation is the ancient and more firmly established form, and expresses the opinion that other disturbances of the summer pupa, such as extreme heat or mechanical motion, may cause a reversion to the older form. My experiments *seem* to indicate further a *direct* effect of temperature in altering colour, &c., in *both* broods of the seasonally dimorphic *illustraria*, causing the summer pupa to yield a much darker moth and the autumn pupa a much paler one, the darkness or the paleness in either case depending in a great degree on the length of the exposure. And the very marked effects of a similar kind produced on the pupa of *autumnaria*, which I believe is nowhere double-brooded, also appear to indicate a similar direct effect of temperature on colour: I do not know if there is any reason for ascribing it in the case of this species to reversion.

5. *Stage in which temperature most operative.*—There is no doubt a strong predisposition, in an individual belonging to a double-brooded species, at some period of its development, towards one of the two different destinations, *i. e.*, the emerging in the summer and with the summer colouring, or the lying over until the spring and then emerging in the spring colouring. The experiments lead me to think that in the species operated on by me the predisposition has become so decided in the *larval* stage that no treatment of the pupa can afterwards entirely alter it, but that in the early larval stage

treatment can—I do not say in all cases—either give the required predisposition, or, where it exists naturally, can completely reverse it.

Perfect Insects, icing.—From the 20th to the 23rd July I iced 5 male and 2 female *illustraria*, a day or two after their emergence. They were frequently looked at and seemed in a lethargic condition, nearly motionless, reviving, however, immediately in the warm air of the room. By the 15th September, *i. e.*, after about 55 days, they seemed less inclined to move, and I placed them for an hour or two at a cooling temperature, and then in the air of the room, where the temperature was about 64°. One female was dead; 5 males and 1 female were alive and could flutter a little, but only one was able to crawl up the side of the box; and, after keeping them for a day or two, they showed no signs of reviving.

Incidental Matters.—(1) *Male longer in pupa than female.*—The experiments recorded last year indicated that in the species operated on the pupal stage was longer in the male than in the female. With a view to place this matter beyond doubt, I made some exact experiments by noting as closely as I could the time of (1) spinning-up, (2) pupating, (3) emergence, and found myself able to carry out the observations very accurately. They gave the following results:—

autumnaria (forced). Table VI.

	7 males. Days.			9 Females. Days.		
	Longest.	Shortest.	Average.	Longest.	Shortest.	Average.
From spinning-up to emergence ..	17¼	16½	17	15	14	14¼
From pupating to emergence	15½	14½	15	13	12	12½

The extreme regularity of the period of duration in all cases will be noted: the slowest female was considerably ahead of the fastest male. As the males and females emerged at the same time, the male must have been on the average earlier to pupate than the female, from which it follows either that the male feeds up faster than the female, or that the female hatches earlier, a thing quite possible, as the hatching in this species extends over a period of many days. A practical conclusion seems to be that small larvæ of this and similar species pupating early are almost sure to be males,

while large ones found late in the season are almost sure to be females.

In some *autumnaria* (Table VII.) that were cooled for a period of 28 days there was a similar difference, only slightly greater, averaging $2\frac{1}{2}$ to 3 days in favour of the female.

In some *alniaria* (Table XII.) the difference was greater still, amounting (in some that had been cooled for 28 days) to an average of 4 days in favour of the female.

In *illustraria*, comparing 25 iced males with 15 iced females, I find that the former averaged 12·2 days from the time of being taken out of the ice, the latter 10·6 days.

(2) *Slow development of the pupa during the icing period.*—My experiments do not enable me to measure this accurately, as the temperature to which the pupæ were exposed, after being taken out of the ice, varied with the varying temperature of the year. As far as I can guess, I should say that 120 days at 33° represent as regards progress in time for development certainly not more than 3 days at 65°.

(3) *Obscurity of the causes on which the vigour of a brood may depend.* — I add some observations on the deterioration in some cases of the heredity broods of *illustraria*, because it is of general importance to all who are bringing up larvæ for scientific and other purposes to get, if possible, at the causes of this deterioration with a view to its prevention. All who have bred on a considerable scale are familiar with it as a frequent result with many species, but by no means with all, especially when care is taken, as it has been with my *illustraria*, to bring them up under the most favourable conditions. The second generation of those bred in captivity, *i. e.*, the larvæ fed in the autumn of 1887, produced remarkably large and healthy moths, the largest I have ever seen. There was some falling off in health and size in the next emergence (July, 1888), and a very great falling off in both respects in the following autumn-fed brood. Since then the health and size have continued with those bred by me to be about the same, that is, poor. But the circumstance I wish particularly to call attention to is that the deterioration in some cases, which I should be glad to account for, has

given place to an opposite result. Some broods, which with me had become a mere remnant, few in number and small in size, produced eggs, which I sent to my friend Miss Pridham, of Wimbledon, who has been rendering valuable aid in these experiments, and these have produced much larger, more numerous, and more healthy moths, and that not in one case, but in several. The only difference that I can see in the treatment is that they have been sleeved on old cherry instead of young birch, and have been in a rather warm situation. But none could have been finer than those I reared on young birch in a cool situation in 1887. After much consideration I cannot see that either interbreeding, kind of food, crowding, temperature, moisture, change of locality, or any other circumstances I can think of, account for the difference. The fact that the deterioration is not continuous is encouraging, and I shall be very much dissatisfied if, with the kind suggestions of members of this Society, the cause of it cannot be ascertained, for the benefit of myself and others. I have always thought that the causes of the wholesale deaths one reads of in narratives of larval bringing up, for example, in the late Mr. Buckler's work, require more investigation than they have received. The only conjecture I can make as to this particular case—and it is a conjecture only—is that possibly *illustraria* requires a change of diet after a generation or two. There are indications of a liking for such change in individuals; larvæ beaten from oak showed with me a decided preference for birch and willow, and some brought up on birch took to rose in their last stage.

Some General Conclusions. — I venture to submit some of the principal conclusions of a general kind to which the experiments recorded in this paper and in previous ones seem at present to point. As to some there will probably be little or no difference of opinion, and as to others, no doubt further experiment is necessary, and their apparent results require also to be considered by the light derived from a knowledge of the habits and life-histories of many other species than I have any experience of. The Tables in the Appendix show in detail the facts as regards each individual in many of the broods operated on by me, with the results stated. They will enable others to judge how far my

conclusions appear to be well-founded, and I hope that so many recorded facts, the substantial accuracy of which may be relied on, may prove useful in other ways to some of those who are prosecuting biological researches.

I. *As to seasonal double-brooded species.*—This term is used as a name, not a definition, and in the restricted sense of a species which has two (or more) generations in a year, one of them passing the pupal stage in the winter, the insects belonging to this generation, which I will call the winter type, differing from those belonging to the summer generation, which I will call the summer type, not only in (1) the season of the year during which their existence is passed, and (2) the duration of that existence, sometimes three or four times as long as that of the summer type, but also often presenting differences in (3) size, (4) shape, (5) colour, and (6) markings. (The sense in which I use the term excludes certain species of which I have little knowledge, such, for example, as those which are many-brooded in countries where there is no real winter; also those species which pass the winter in some other than the pupal stage.)

1. In such a species a young individual may have, and often has, a constitutional capacity for developing into either type, according to external circumstances.

2. It seems probable that there is from the beginning of the existence of the individual a tendency, which may be very strong, or very slight, to develop in the direction of one of the two types.

3. If there is no such innate tendency in an individual, it can be imparted by external influences during the early part of its existence.

4. Where the tendency exists, it varies in strength in different individuals. In the case of some species, or some broods or individuals of some species, the tendency from the beginning is so strong that it cannot be overcome by any external influences.

5. In other cases the tendency can be overcome and converted into the opposite one, or turned more or less in the direction of it, by such influences. The *decision* as to the type to be assumed is come to before the termination of the growth of the larva, and this decision may be completely controlled in some cases by external influences applied before that period. For example, in

1887, by keeping the insect in all stages at a temperature of about 80°, I brought out four successive broods of *illunaria* in ten months, all of the summer type.

6. After larval growth is completed, no complete conversion of the one type into the other can be effected; it seems clear that such a conversion cannot be made as regards size, and but slightly, if at all, as regards shape; and it seems probable that it cannot be completely made as regards colour or markings. This incapability as to colour and markings certainly exists as respects *illustraria*, also, according to the published experiments before adverted to, as respects *A. levana* and *P. ajax;* and I gather that in the cases published as to *P. rapæ*, *P. napi*, *P. pharos*, and *P. interrogationis* the butterflies from the iced summer pupæ presented some differences from the normal form proceeding from the winter pupa.

7. In the species experimented on by me (and in some others) the capability of being turned during the pupal period from the one type partially in the direction of the other exists in both the summer and the winter type, but is *much* greater in the former than in the latter.

II. *As to both double-brooded and single-brooded species.*

8. In those experimented on by me the temperature to which the pupa is exposed modifies the colour and markings of the imago, sometimes in a striking manner; low temperature in these species tending to melanism.

9. The difference between 65° and 80° in the temperature to which the pupa is exposed is sufficient in some cases to make a very marked difference. In *E. autumnaria* it is enough to make the whole difference in appearance between the ordinary pale continental type and the dark and spotted type.

I do not see that the experiments in themselves lend any support to the theory that *illustraria*, having originally been a single-brooded species suited to a cold climate, could, as it spread to a warmer region, or as a glacial period receded, pass the winter in any other than the pupal stage, and by that means adapt itself to become regularly double-brooded; for in no stage but this have I been able to carry it alive through even a short artificial winter, and the winters on the hypothesis must have been very long ones. Nor do they appear to

help to show how so great a change as that from single-broodedness with its pupa of 7 months or more to double-broodedness with its summer pupa of 2 or 3 weeks could have been made. Assuming the autumn pupa to have been the original one, it must have had an even stronger disposition than the modern seasonal autumn pupa not to emerge until after a winter had passed over it, and the extreme reluctance of the modern seasonal autumn pupa to anticipate its regular period of emergence has been shown. Perhaps the species, or at least the genus, may claim a very high antiquity, and may have lived through several periods of advancing as well as of receding cold; but I cannot pursue this speculation, for I know too little of such matters to venture beyond the solid ground of fact more than the very few steps which are the necessary incentive to further investigation.

Note, 6th March, 1890.—I can now complete the history of the iced summer pupæ of *S. illustraria* mentioned pp. 96—99. I had 12 living on the 28th December, when they had been iced 22 weeks. Taken out at successive intervals of 14 days, 5 of them died, including the 2 taken out at 32 weeks. The survivors show no increase of darkness over those iced 16 or 18 weeks, and have altogether a less vigorous appearance than the great majority of those which emerged after 20 weeks' icing or less; but I am doubtful if the longer duration of the icing is the cause of this deterioration, as the larvæ of this brood that were late in pupating were decidedly less healthy than the earlier ones.

The Roman numerals refer to the months; "Ord." means ordinary temperature; "*m*," "*a*," "*e*" mean "morning," "afternoon," "evening."

TABLE I.—Icing eggs of *S. illunaria*.

Origin.	Iced.	Nr.	Colour	Taken out.	Nr.	Days Iced.	Hatching.			
							Began	Ended	Number.	
♀ taken New Forest	4 v	34	Red.	18 v	16	14	25 v	27 v		16
				1 vi	16	28	6 vi	.....	5	
							7 vi	.....	8	
							8 vi	.....	1	14
♀ taken Scarborough	4 v	38	Red.	15 vi	4	42	20 vi	22 vi	....	3
				29 vi	6	56	5 vii	.....	....	7
				30 vi	12	57				
				9 vii	10	66	.....	.....	....	0

TABLE II.—Icing eggs of *S. illustraria*.

Origin.	Laid	Nr.	Iced.	Nr.	Colour	Taken out.	Nr.	Days Iced.	Hatching.			
									Began	Ended	Number.	
Bred parents	5 v	251	(not iced)	41					23 v	26 v		36
Same parents	6-7 v	....	7 v	30	"Green."	24 v	30	17	24 v	.....	1	
									25 v	.....	1	
									4 vi	.....	6	
									5 vi	.....	10	
									6 vi	.....	3	21
			7 vi	140	Red.	24 v	20	14	31 v	2 vi	....	19
						7 vi	9	28	14 vi	.....	4	
									15 vi	.....	3	7
						21 vi	10	42	.....	.....	....	0
						1 vii	20	52	.....	.....	....	0
						6 ix	20	58	.....	.....	....	0
Bred parents	19-22 vii	110	1 viii	110	Red.	6 ix	40	36	.....	.....	....	1
Summer emergence	.....	....	.....	.....		14 x	25	74	.....	.....	....	0

TABLE III.—Preliminary icing experiments on *S. illustraria*. Larvæ just spun up.

No. of ♀ parent.	Sp. up.	Iced.	Cooled	Pupated.	Iced.	Taken out.	Emerged	Sex.	Days. Pupating. Iced.	Pupating. Cooled	Pupa. Iced.	Pupa. Ordy.	
"Red" 11	23 vi	23 vi	22 vii	28 vii	29 vii	30 vii	Died.	..	29	6	1	..	
,, 12	,,	,,	,,	,,	,,	9 ix	24 ix	♂	29	6	42	15	
,, 51	30 vi	30 vi	22 vii	.....	.....	30 vii	died 1 viii	..	22	..	..	..	
,, 52	,,	,,	,,	.....	.....	,,	died 1 viii	..	22	..	..	..	
"Dark" 28	23 vi	23 vi	22 vii	28 vii	29 vii	9 ix	25 ix	♂	29	6	42	16	
,, 29	,,	,,	,,	,,	,,	,,	23 ix	♀	29	6	42	14	Crippled.
,, 73	30 vi	30 vi	22 vii	.....	.....	30 vii	died 1 viii	..	22	8	..	2	
,, 74	,,	,,	,,	.....	.....	,,	died 1 viii	..	22	8	..	2	

Deaths probably caused by sudden removal to warm, dry air.

TABLE IV.—Larvæ of *S. illustraria* on the point of pupating.

No. of ♀ parent.	Sp. up.	Iced.	Cooled	Pupated.	Taken out.	Emerged	Sex.	Days. Pupating. Ordy.	Pupating. Iced.	Pupa. Iced.	Pupa. Ordy.
"Red" 1	21 vi	23 vi	.....	26 vi	25 vii	6 viii	♂	2	3	29	12
,, 2	,,	,,	.....	27 vi	,,	,,	♂♂	2	4	28	12
,, 43	29 vi	30 vi	.....	6 vii	3 viii	17? viii	♀	1	6	28	14
,, 45	,,	,,	22 vii	1 viii	30 vii	died 1 viii	..	..	..	..	..
"Dark" 13	22 vi	23 vi	.....	26 vi	25 vii	8 viii	♂	1	3	29	14
,, 14	,,	,,	.....	24 vi	,,	6 viii	♂	1	2	31	12
,, 63	29 vi	30 vi	.....	4 vii	1 viii	16 viii	♂	1	4	28	15
,, 65	,,	,,	.....	5 vii	2 viii	17? viii	♂	1	5	28	15

No. of ♀ parent.	Sp. up.	Cooled	Iced.	Taken out.	Emerged	Sex.	Days. Ordy.	Cooled	Iced.	Ordy.	
"Dark" 2	19 vi	30 vi	7 vii	5 ix	5 ix	♂	11	7	60	0	Crippled, not room to expand.
,, 3	,,	,,	,,	,,	Died.	..	11	7	60		
,, 4	,,	,,	,,	,,	3—5 ix	♂	11	7	59	0	
,, 11	21 vi	30 vi	7 vii	5 ix	Died.	..	9				
,, 15	22 vi	,,	,,	,,	Died.	..	8				
,, 16	,,	,,	,,	,,	Died.	..	8				
,, 33	24 vi	5 vii	7 vii	4 viii	9 viii	♂	11	2	28	5	
,, 34	,,	,,	,,	,,	14 viii	♀	11	2	28	8*	
,, 45	26 vi	,,	,,	5 ix	10 ix	♀	9	2	60	5	Crippled.
,, 54	27 vi	,,	,,	,,	12 ix	♂	8	2	60	7	Crippled.
"Red" 33	28 vi	5 vii	7 vii	4 viii	Died.	..	7	2	28		
,, 34	,,	,,	,,	,,	14 viii	♀	7	2	28	8*	
,, 35	,,	,,	,,	,,	13 viii	♂	7	2	28	7*	
,, 36	,,	,,	,,	,,	,,	♂	7	2	28	7*	
,, 37	,,	,,	,,	5 ix	12 ix	♀	7	2	60	7	
,, 38	,,	,,	,,	,,	Died.	..	7	2	60		
,, 39	,,	,,	,,	,,	10 ix	♂	7	2	60	5	Crippled.
,, 40	,,	,,	,,	,,	12 ix	♂	7	2	60	7	Crippled.

* Counted by deducting 2 days of cooling while I was away from home (10—12 viii).

TABLE VI.—*E. autumnaria*. Forced larvæ, forced pupæ.

No.	Sp. up.	Pupated.	Emerged.	Sex.	Days. Pupg.	Pupa.	Total.	
1	2 vi	4 vi	.....	....	2			
2	4 vi	6 vi *m*	.....	....	2			
5	6 vi *m*	7 vi *a*	27 vi *m*	♂	1	20	21	
6	6 vi *m*							
7	6 vi *m*	8 vi *a*	.....	....	2			Affected by excessive heating; all but one died.
11	6 vi *a*							
12	6 vi *a*							
15	8 vi *a*							
19	9 vi *a*							
20	9 vi *a*							
21	10 vi *a*							
23	11 vi *m*	12 vi *a*	27 vi *a*	♂	1½	15	16½	
24	,, *a*	14 vi *m*	26 vi *a*	♀	2½	12½	15	
25	12 vi *a*	14 vi *m*	29 vi *m*	♂	1½	15	16½	
26	12 vi *a*	14 vi *a*	26 vi *a*	♀	2	12	14	
27	12 vi *a*	14 vi *m*	26 vi *a*	♀	1½	12½	14	
28	12 vi *a*	14 vi *a*	30 vi *m*	♂	2	15½	17½	
29	12 vi *a*	14 vi *a*	29 vi *a*	♂	2	15	17	
30	13 vi *a*	15 vi *m*	27 vi *a*	♀	1½	12½	14	
31	13 vi *a*	15 vi *m*	27 vi *a*	♀	1½	12½	14	
32	13 vi *a*	15 vi *a*	30 vi *a*	♂	2	15	17	
33	13 vi *a*	16 vi *m*	1 vii *m*	♂	2½	15	17½	
34	18 vi *m*	20 vi *a*	2 vii *a*	♀	2½	12	14½	Pl. fig. 8.
35	19 vi *m*	20 vi *a*	3 vii *m*	♀	1½	12½	14	
36	19 vi *m*	21 vi *m*	5 vii *a*	♂	2	14½	16½	Pl. fig. 7.
37	19 vi *m*	20 vi *a*	3 vii *m*	♀	1½	12½	14	
38	19 vi *m*	20 vi *a*	3 vii *a*	♀	1½	13	14½	

TABLE VII.—*E. autumnaria*. Forced larvæ, cooled pupæ.

No.	Sp. up.	Pupated.	Cooled.	Taken out.	Emerged.	Sex.	Days.					
							Pup.	Ord.	Cool	Ord.	Tot.	
3	5 vi	8 vi *a*	10 vi *a*	8 vii	16 vii *a*	♀	3	2	28	8	41	Pl. fig. 10
4	5 vi	8 vi *a*	10 vi	8 vii	19 vii *e*	♂♂	3	2	28	11	44	Pl. fig. 9
8	6 vi *m*	9 vi *a*	10 vi	8 vii	20 vii *m*	♂♂	3½	1	28	12	44½	
9	6 vi *m*	9 vi *a*	10 vi	8 vii	20 vii *m*	♂♂	3½	1	28	12	44½	
10	6 vi *m*	9 vi *a*	10 vi	8 vii	19 vii *a*	♂♂	3½	1	28	11	43½	
13	6 vi *a*	10 vi *a*	12 vi *a*	10 vii	23 vii *m*	♂♂	4	2	28	13	47	
14	7 vi *a*	11 vi *a*	13 vi *m*	11 vii	20 vii *m*	♀	4	1½	29	9	42½	
16	9 vi *a*	Died pupating										
17	9 vi *a*	14 vi *m*	15 vi *m*	13 vii	22 vii *m*	♀	4½	1	28	9	42½	
18	9 vi *a*	11 vi *a*	13 vi *a*	11 vii	19 vii *e*	♀	2	2	28	8	40	Crumpled
22	10 vi *a*	15 vi *m*	16 vi *m*	14 vii	23 vii *e*	♀	4½	1	28	9	42½	

Note to Table VII.—As soon as the larvæ were found to be spinning-up they were removed from the forcing-box to the ordinary temperature of the room, and were "cooled" a day or two after pupating.

TABLE VIII.—*E. autumnaria*. Sleeved as larvæ, ordinary temperature as pupæ.

No.	Sp. up.	Pupated.	Cooled	Ord. temp.	Forced.	Ord. temp.	Cooled	Ord. temp.	Emerged	Sex.
7	21 vii	24 ? vii	10 viii	12 viii	13 viii	16 viii	.....	.....	16? viii	♂♂
11	25 vii	26? vii	,,	,,	,,	.....	16 viii	25 viii	27 viii	♂♂
12	25 vii	26? vii	.....	26 vii	.....	.....	,,	,,	31 viii	♂♂
13	.....	26? vii	10 viii	12 viii	13 viii	.....	.....	.....	14 viii	♂♀
15	26 vii	27 vii *a*	.....	15 viii	.....	.....	.....	.....	16 viii	♂♀
21	30 vii *a*	30 vii *e*	.....	30 vii *e*	.....	.....	16 viii	25 viii	1 ix	♂♀
22	30 vii *a*	1 viii *m*	.....	.....	.....	.....	,,	,,	1 ix	♂♀

Note.—The reason of the forcing and cooling was that I was away from home from 10th to 12th August, and again from 16th to 25th August, and measures had to be taken to prevent the emergence of the moths during my absence. Upon a careful examination, and a comparison with some bred in 1888 from larvæ and pupæ sleeved as larvæ, and kept at an ordinary temperature all through the pupal period, which they closely resemble in appearance, I do not think the forcing or cooling has affected their appearance. Neither forcing nor cooling was in any case applied till the pupæ had been 15 days at the ordinary temperature. (Nos. 12 and 15 are figs. 1 and 2 in the Plate).

TABLE IX.—*E. autumnaria*. Sleeved as larvæ, forced as pupæ.

No.	Sp. up.	Forced.	Pupated.	Emerged	Sex.	Days.			
						Pupg.	Forced	Total.	
1	13 vii	13 vii	14 vii *e*	27 vii *a*	♀	1½	13	14½	
2	13 vii	13 vii	15? vii	29 vii *m*	♂	2?	14	16?	
8	,,	25 vii	.....	6 viii *a*	♀	2?	12	14?	Pl. fig. 4
14	.....	26 vii	Pupa.	7 viii *m*	♂	2?	12	14?	
16	26 vii	26 vii	27 vii *a*	7 viii *m*	♀	1½	11	12½	
17	,,	,,	27 vii *a*	9 viii *a*	♂	1½	13	14½	
18	,,	,,	27 vii *e*	10 viii *m*	♂	1½	13½	15	Pl. fig. 3
20	,,	,,	28 vii *e*	9 viii *a*	♀	1½	12	13½	

TABLE X.—*E. autumnaria*. Sleeved as larvæ, forced as pupæ, and afterwards iced.

No.	Sp. up.	Forced	Pupated.	Cooled.	Iced.	Taken out.	Emerged	Sex.	Days.				
									Pupg.	Forced	Iced.	Ordy.	
5	21 vii	21 vii	23 vii *a*	30 vii *m*	30 vii *a*	27 viii	7 ix	♀	2	7	28	11	Crippled.
6	,,	,,	23 vii *e*	30 vii *m*	,,	,,	Died.	..	2½	7	28		
9	25 vii	25 vii	27 vii *m*	....	3 viii	14 ix	Died.	..	2	7	42		
10	,,	,,	27? vii	.....	,,	,,	Died.	..	2?	7	42		

TABLE XI.—*E. autumnaria*. Sleeved as larvæ, cooled or iced as pupæ.

No.	Sp. up.	Cooled.	Pupated.	Iced.	Taken out.	Emerged	Sex.	Days.					
								Pupg.	Cooled	Iced.	Ordy.		
3	16 vii	16 vii	28 vii	29 vii	26 viii	18 ix *a*	♂	12	1	28	23		
4	,,	,,	26 vii	27 vii	25 viii	19 ix *a*	♂♂	10	1	29	25	Crippled.	
19	26 vii	26 vii	9 viii	.....	6 ix	22 ix *m*	♀	14	42	..	16		Pl. fig. 6
23	30 vii	30 vii	1 viii	1 viii	15 ix	13 x *m*	♀	2	..	45	28	Crippled.	
24	,,	,,	5 viii	6 viii	,,	13 x *a*	♀	6	1	40	28	Crippled.	
25	,,	,,	10 viii	.....	,,	10 x *a*	♂♂	11	36	..	25	Crippled.	
26	,,	,,	1 viii	.....	,,	4 x *e*	♂♂	2	45	..	19		Pl. fig. 5
27	30 vii	2 viii	2 viii	.....	29 ix	12 x *e*	♂	3	58	..	13	Crumpled.	
28	2 viii?	,,	,,	.....	11 x	Died.	..	..	70				
29	,,	4 viii	4 viii	.....	13 x	21 x *m*	♀	2	70	..	8	Crippled.	
30	,,	,,	,,	.....	21 x	Died.	..	2	78				
31	2 viii	5 viii	5 viii	.....	,,	Died.	..	3	77				
32	7 viii	12 viii	10? viii	.....	,,	29 x	♀	3	72	..	8	Crippled.	
33	8 viii	13 viii	13 viii	.....	,,	Died.	..	5	69				
34	12 viii	16? viii	16? viii	.....	2—4 ix	10 ix	♀	4?	48?				
35	17? viii	6 ix	21? viii	.....	21 x	Died.	..	4?	45?	..	16?		

Notes to Table XI.—Nos. 3, 4, 19, 23, 24, and 25 were cooled as pupating larvæ, the others after pupating, sometimes a few minutes after.

Table XII.—*E. alniaria* (*tiliaria*), forced as larvæ, cooled as pupæ.

No.	Sp. up.	Pupated.	Cooled.	Taken out.	Emerged	Sex.	Days.		
							Pupg.	Cooled	Ordy.
6	5 vi	8 vi *a*	10 vi	8 vii	21 vii *m*	♂	3	28	13
7	6 vi *a*	10 vi *a*	11 vi *a*	9 vii	died		4		
8	,,	,,	,,	,,	24 vii *m*	♂	4	28	15
9	,,	,,	,,	,,	died		4		
10	,,	,,	,,	,,	19 vii *a*	♀	4	28	10
13	9 vi *a*	died							
14	,,	13 vi *a*	14 vi *a*	12 vii	died		4	28	
15	,,	,,	,,	,,	22 vii *a*	♀	4	28	10

Table XIII.—*E. alniaria* (*tiliaria*), sleeved as larvæ, forced as pupæ.

No.	Sp. up.	Pupated.	Forced.	Emerged	Sex.	Days.		
						Pupg.	Ordy.	Forced
5	3 vii	4—6 vii	7 vii	17 vii *m*	♂	2?	2?	10?
6	,,	,,	,,	18 vii *e*	♀	2?	2?	11?
7	5 vii	6 vii	7 vii	19 vii *m*	♂	1?	1?	12?
8	,,	7 vii	7 vii	20 vii *m*	♂	2?	0	13?
9	5 vii	.....	8 vii	20 vii *m*	♂	3?	1	12?
10	10 vii	.....	10 vii	died				
12	13 vii	15 vii *a*	13 vii	28 vii	♂	2	0	13
15	.....	.....	16 vii	31 vii *a*	♂	.....	.....	15
25	.....	19 vii?	19 vii	3 viii *m*	♂	.....	.....	15
26	.....	21 vii?	21 vii	5 viii *m*	♀	.....	.....	15
27	.....	.....	21 vii	died				

Table XIV.—*E. alniaria* (*tiliaria*), sleeved as larvæ, ordinary temperature as pupæ.

No.	Sp. up.	Pupa, found.	Emerged.	Sex.
1	.....	26 vi	14 vii	♂
2	.....	3 vii	23 vii	♀
3	.....	3 vii	23 vii	♂
4	3? vii	4—6 vii	23? vii	♂
11	15 vii	.....	14 viii *m*	♂

TABLE XV.—*E. alniaria* (*tiliaria*), sleeved as larvæ, forced, cooled, or iced as pupæ.

No.	Sp. up.	Cooled.	Forced.	Pupated.	Iced.	Taken out.	Emerged	Sex.	Pupating.	Pupa, days. Ord.	Iced and Cooled	Ord.	
13	16? vii	.....	.....	Pupa	21 vii	2 ix	died	....	....	5	.....		
14	16? vii	16 vii	.....	Pupa	21 vii	2 ix	died	....	....	5	43		
16	16 vii	16 vii	.....	20 vii	.....	10 ix	23 ix *a*	♂	4	52	.....		Crippled.
17	,,	,,	.....	30 vii	30 vii	28 viii	.....	♂	14	....	29		
18	.....	17 vii	.....	Pupa	19 vii	15 ix	13 x *e*	♂	....	2	58	28	Crippled.
19	.....	,,	.....	Pupa	,,	,,	12 x *m*	♂	....	2	58	27	Subdiaphan-
20	.....	,,	.....	Pupa	,,	,,	died	....	....	2	58		ous.
21	17 vii	19 vii	.....	19 vii	20 vii	31 viii	28 ix *m*	♂	2	....	42	28	
22	,,	,,	.....	,,	,,	,,	29 ix *a*	♂	2	....	42	27	Crippled.
23	,,	21 vii	.....	21 vii	22 vii	15 ix	17 x *m*	♂	4	....	55	32	Crippled.
24	19 vii	16 viii	.....	23? vii	.....	25 viii	29 viii	♂	4?	24?	9	4	
28	25 vii	16 viii	.....	28 vii *m*	.....	25 viii	28 viii	♀	3	19	9	3	
29	27? vii	.....	.....	Pupa	27 vii	15 ix	16 x *m*	♂	....	....	50	31	
30	27? vii	.....	.....	Pupa	27 vii	15 ix	16 x *a*	♂	....	....	50	31	
31	27 vii	27 vii	.....	.....	.....	15 ix	died						
32	,,	.....	27 vii	28 vii	5 viii	2 ix	died						
33	,,	.....	,,	29 vii *m*	,,	2 ix	died						
34	30 vii	30 vii	.....	6 viii	.....	28 viii	17 ix *m*	♂	7	....	22	20	
35	2 viii	2 viii	.....	6 viii	.....	11 x	died	....	4	....	36		
36	5 viii	9 viii	.....	8 viii	.....	15 ix	21 x *m*	♂	3	....	37	36	Crippled.

Tables XVI., XVII.—In this case a third (forced) brood of *illustraria* hatched 4 viii, "split." From 22 to 28 viii, 26 spun up, 10 males and 16 females, all perfect, between 30th Aug. and 8th Sept.; of the rest, some died and about 70 spun up, beginning 5 ix; 36 of them became living pupæ by 26th Sept., and the following tables show the subsequent treatment of these 36, and the results as to the 12 which survived :—

TABLE XVI.—*Illustraria* autumn pupæ, forced.

No.	Sp. up and forced.	Emerged.	Sex.	Days.		
1	9—12 ix	12 xi	♂	63	Crippled	
2	14 ix	26 xii	♂	103	Crippled	
1	12—14 ix	11 xi	♀	59	Perfect	Plate, fig. 9.
2	,,	9 xii	♀	87	Crippled	
3	,,	,,	♀	87	Crippled	
4	,,	10 xii	♀	88	Crippled	

TABLE XVII.—*Illustraria* autumn pupæ, warmed, then wintered (frosty weather).

No.	Sp. up and warmed.	Ord. temp.	Wintd.	Ord. temp.	Warmed.	Emerged.	Sex.	Days. Warm.	Ord.	Wintd.	Ord.	Warm.		
3	12-14 ix	12 xi	27 xi	1 i	9 i	13 ii	♂	60	15	35	8	35	Fair	
4	,,	,,	,,	,,	,,	28 ii	♂	60	15	35	8	50	Crippled	
5	,,	,,	,,	,,	,,	1 i	♀	60	15	35	0	0	Fair	
6	,,	,,	,,	,,	,,	3 i	♀	60	15	35	2	0	Crippled	
7	,,	,,	,,	,,	,,	22 i	♀	60	15	35	8	13	Perfect	Pl. fig. 10
8	22 ix?	,,	,,	,,	,,	18 ii	♀	55?	15	35	8	40	Perfect	

The object of the "ordinary temperature" was to prevent a sudden change of temperature. "Warm" means a temperature of about 70°.

TABLE XVIII.—*Illustraria* autumn pupæ at ordinary indoor temperature (45°–55°), afterwards wintered or warmed, or both.

No.	Sp. up.	Wintd.	Ord. temp.	Warmed.	Emerged	Sex.	Days. Ord.	Wintd.	Ord.	Warm.
1	26 ix	27 xi	1 i	9 i	28 i	♂	62	35	8	19
2	26 ix	.....	.....	29 i	9 ii	♂	....	.....	125	11
3	17 ix	.....	.....	,,	9 ii	♂	....	.....	134	11
4	26 ix	.....	.....	,,	11 ii	♂	....	.....	125	13
5	26 ix	.....	.....	,,	11 ii	♂	....	.....	125	13
6	26 ix	27 xi	1 i	9 i	13 ii	♂	62	35	8	35
7	26 ix	27 xi	1 i	9 i	14 ii	♂	62	35	8	36
8	28 ix	,,	,,	,,	15 ii	♂	62	,,	,,	37
9	6 x	,,	,,	,,	16 ii	♂	52	,,	,,	38
10	28 ix	,,	,,	,,	16 ii	♂	60	,,	,,	38
11	29 ix	,,	,,	,,	17 ii	♂	59	,,	,,	39
12	6 x	,,	,,	,,	23 ii	♂	52	,,	,,	45
13	26 ix	,,	,,	,,	28 ii	♂	62	,,	,,	50
14	2 x	.....	.....	3 iii	11 iii	♂	....	.....	152	8
15	26 ix	.....	.....	,,	,,	♂	....	.....	158	8
1	28 ix	.....	.....	29 i	9 ii	♀	....	.....	123	11
2	14 ix	27 xi	1 i	9 i	9 ii	♀	74	35	8	31
3	15 ix	.....	.....	3 iii	9 iii	♀	....	.....	169	6
4	2 x	.....	.....	3 iii	10 iii	♀	....	.....	152	7
5	26 ix	.....	.....	3 iii	11 iii	♀	....	.....	158	8

Nos. 1 and 6 to 13, ♂ and 2 ♀ (wintered) very slightly darker than the rest; No. 1, ♂, especially dark.

APPENDIX.

Descriptive summary of the effects of the temperature experiments upon the markings of the moth Ennomos autumnaria (*vel* alniaria). By W. White, F.E.S.

A.—(1) Larvæ sleeved, temperature conditions normal throughout, including (2) the pupal period.

♂. Five specimens: all *rather variable*, more or less irrorated.

♀. Two: the spotting *large in one case, finer and more sparse in the other;* both darker towards the outer margin of especially the fore wings.

These may be considered fair types of the ordinary variations occurring within a brood.

B.—(1) Larvæ sleeved, (2) pupæ forced.

♂. Four: all *paler and more ruddy* than in A, and *nearly plain* in colour, only one having rather faint spots.

♀. Four: ditto, two with faint spots.

General tendency. Plainer than type; spots lost.

C.—(1) Larvæ forced, (2) pupæ forced.

♂. Eight: of *more ruddy* appearance, and practically *unspotted*, not one possessing decided irroration; *the costal margin paler*, but the colour towards the edges of the wings appearing deeper in contrast with the general plainer coloration; the band-lines *less continuous*, and in some quite *faint;* some have local spotting more or less faint or blotchy, while in others the spotting is almost entirely absent.

♀. Nine: similar in character to the males, but the irroration is *sparse* in nearly all the specimens; edging to the marginal toothing darker.

General tendency. Ruddier than type, on account of greater freedom from superimposed markings. The sexes resemble one another more closely than normally, as in A.

D.—(1) Larvæ sleeved, (2) pupæ iced, or cooled.

♂. Five (two of them crippled): *rather darker* than A, the irrorations *both increased and more blotchy; the band-lines faint, the inner one entirely gone.*

♀. Five (two crippled, 1 crumpled, 2 perfect): variable, but fairly normal, excepting that *the inner band-line is lost in every individual but one.*

General tendency. Amplification of spotting with elimination of inner line.

E.—(1) Larvæ forced, (2) pupæ cooled.

♂. Five: *largely irrorated* with the darker fuscous marking, producing the effect of an entire darkening of the coloration, but the ground colour is really about normal; the outer band-line *very blotchy*, while the inner one is entirely lost in some in the general irroration, or it may be irrespective of it; the venation lines are rendered more distinct in most cases on account of being unspotted.

♀. Five: on the whole *the irroration is less developed than in the ♂, and finer*, while the *ground colour is decidedly paler and more uniform* (with the marginal shading but slightly pronounced), but the irrorations between the band and the anterior portion of the outer margin of the fore wings of most of the individuals have become merged into *a blotchy shade;* the inner band-line is *entirely lost* in all but one, which has instead a blotchy patch along that part of the field; in most specimens (*i. e.*, all but one) the dentated outline of the *hind wing* has a continuous dark line along the outer margin.

General tendency. Increased development of the irroration, with continued elimination of the inner band-line. The ground colour is warmer in both sexes than in the D form, the larvæ of which were normally conditioned.

Under each set of experiments with abnormal temperatures (excluding A) the band-lines spring directly from the costa, instead of starting with an acute angle, or hooked curve, across the first nervure, as is the case usually in the A series (see figs. 1 and 2). But, curiously enough, this angulation observable in these types is contrary to the regular specific character, as described

by Mr. Stainton in his 'Manual.' Broadly speaking, the effects produced under B and C conditions are very similar, and those under D and E are similar, but in each direction there is a marked intensification of the chief characteristics in both C and E, the larvæ of which were forced.

Explanation of Plates IV. & V.

PLATE IV.

E. autumnaria.

Figs. 1, 2. Ordinary temperature as larvæ, and as pupæ, ♂ and ♀.

3, 4. Ordinary temperature as larvæ, forced as pupæ, ♂ and ♀.

5, 6. Ordinary temperature as larvæ, cooled as pupæ, ♂ and ♀.

7, 8. Forced as larvæ, and as pupæ, ♂ and ♀.

9, 10. Forced as larvæ, cooled as pupæ, ♂ and ♀.

All the specimens figured are from the same parents.

PLATE V.

S. illustraria.

Figs. 1, 2. Summer pupæ, not iced, ♂ and ♀.

3, 4. Summer pupæ, iced 16 weeks, ♂ and ♀. The specimens figured 1, 2, 3 and 4 are from the same parents. Fig. 3, though a small part of one posterior wing is imperfectly developed, is selected because it is the best illustration of darkness and change of markings *combined*. There are other specimens more extreme in both particulars.

5. Autumn pupa, forced 17 days, ♀.

6. Autumn pupa, forced 34 days, ♀.

7, 8. Autumn pupæ, not forced, spring emergence, ♂ and ♀. The specimens figured 5, 6, 7 and 8 are from the same parents.

9. Autumn pupa, forced 59 days, ♀.

10. Autumn pupa, warmed 60 days, also wintered 35 days, ♀. The specimens figured 9 and 10 are from the same parents.

11, 12. An ordinary form of the very variable summer emergence, ♂ and ♀.

13, 14. Rather dark examples of the ordinary spring emergence, ♂ and ♀.

V. *The moths of Burma.* Part I.

By Colonel Charles Swinhoe, F.L.S., F.Z.S., &c.

[Read February 5th, 1890.]

Plate VI.

This paper is the first attempt yet made at a comprehensive list of the moths of the Burman region. Mr. Moore has recorded two or three lists of Lepidoptera from Tenasserim and Mergui containing some moths; and Mr. Butler has also recorded a few moths from Moulmein. In Mr. Walker's catalogue of the moths of the British Museum there are but three references to Burma; but Mr. Butler advised me to examine the register of the moths from Archdeacon Clerk's collection in the museum, and there we find that all the moths recorded in Walker's catalogue as from the East Indies, and from Hindustan, from Archdeacon Clerk's collection, are from Moulmein; and amongst them are no less than 93 of Walker's types.

Before leaving India I had the opportunity of going over the collections of moths of the Indian Museum, Calcutta, and of the Phayre Museum, Rangoon, and took many notes concerning Burman moths; and through the great kindness of Mr. Noble, the Curator of the Phayre Museum, I have received for examination a large series of Burman moths, carefully labelled with localities and dates, and have thus been enabled to record a list containing 662 species, including 7 new genera, and 107 new species.

I have to thank Lord Walsingham, who has kindly identified some of the *Tineina*, and has been so good as to describe a new species of *Grapholitha* for this paper; and I have also to thank Mr. Warren for giving me for publication his MS. descriptions of 4 new genera of *Pyrales*, and 4 new species represented in my Burman collection. The types of all the new species will, as usual, be presented to the British Museum.

SPHINGES.

SPHINGIDÆ.

MACROGLOSSINÆ.

1. *Hemaris hylas.*

Sphinx hylas, Linn., Mant., i., p. 539 (1771).
Sphinx picus, Cram., Pap. Exot. ii., pl. 148, & B (1777).
Macroglossa kingi, McLeay, King's 'Survey of Australia,' App., p. 465 (1827).
Sesia cunninghami, Walker, viii., p. 85 (1856).
Moulmein. In B. M.

2. *Macroglossa luteata.*

Macroglossa luteata, Butler, P. Z. S., 1875, p. 241, pl. 37, f. 5.
Tenasserim. In I. M., Calcutta.

3. *Macroglossa obscura.*

Macroglossa obscura, Butler, P. Z. S., 1875, p. 5, pl. 1, f. 2.
Upper Tenasserim. In B. M.

4. *Macroglossa proxima.*

Macroglossa proxima, Butler, P. Z. S., 1875, p. 4, pl. 1, f. 1.
Moulmein. In B. M.

5. *Macroglossa orientalis.*

Macroglossa orientalis, Butler, T. Z. S., ix., p. 528 (1876).
Moulmein (type). In B. M.
Tenasserim. In I. M., Calcutta.

CHŒROCAMPINÆ.

6. *Acosmeryx pseudonaga.*

Acosmeryx pseudonaga, Butler, Ill. Typ. Lep. Het. B. M., v., p. 2, pl. 88, f. 3 (1881).
Bassein, August, 1888. In Phayre Museum, Rangoon.

7. *Pergesa acteus.*

Sphinx acteus, Cram., Pap. Exot., iii., pl. 248, f. A. (1779).

Moulmein. In B. M.
Rangoon, September, 1886. In coll. Swinhoe.

8. *Panacra busiris.*

Panacra busiris, Walker, viii., p. 158 (1856).
Rangoon. In Phayre Museum, Rangoon.

9. *Panacra automedon.*

Deilephila automedon, ♀, Boisd., M. S.
Panacra automedon, Walker, viii., p. 154, ♀ (1856).
Panacra truncata, Walker, viii., p. 160, ♂.
Pegu. In Phayre Museum, Rangoon.

10. *Panacra vigil.*

Sphinx vigil, Guérin, Deless. Voy. dans l'Inde, pt. 2, p. 80, pl. 23, f. 1 (1843).
Sphinx phœnyx, Herr.-Schff., Aust. Europ. Schm., pl. 83, f. 478 (1858).
Rangoon and Mandalay. In coll. Swinhoe.

11. *Chœrocampa elegans.*

Chœrocampa elegans, Butler, P. Z. S., 1875, p. 8, pl. 2, f. 1.
Bassein, August, 1888. In Phayre Museum, Rangoon.
Rangoon, October, 1888. In coll. Swinhoe.

12. *Chœrocampa rafflesii.*

Chœrocampa rafflesii, Butler, T. Z. S., ix., p. 556 (1876).
Mandalay. In coll. Swinhoe.

13. *Chœrocampa oldenlandiæ.*

Sphinx oldenlandiæ, Fabr., Sp. Ins., ii., p. 148 (1781).
Xylophanes gortys, Hübn., Samml. Exot. Schm. Zutr., figs. 513, 514 (1816).
Thyetmyo. In Phayre Museum, Rangoon.

14. *Chœrocampa silhetensis.*

Deilephila silhetensis, Boisd., M. S.
Chœrocampa silhetensis, Walker, viii., p. 143 (1856).
Xylophanes pinastrina, Moore, Lep. Ceylon, ii., p. 18, pl. 87, f. 2 (1882).
Pegu. In Phayre Museum, Rangoon.

15. *Chœrocampa lucasii.*

Deilephila lucasii, Boisd., M. S.
Chœrocampa lucasii, Walker, viii., p. 141 (1856).
Rangoon, December, 1886. In coll. Swinhoe.

16. *Chœrocampa clotho.*

Sphinx clotho, Drury, Ill. Exot. Ins., ii., p. 48, pl. 28, f. 1 (1773).
Sphinx batus, var., Fabr., Ent. Syst., iii., p. 377 (1793).
Moulmein. In B. M.
Mandalay. In coll. Swinhoe.

17. *Chœrocampa nessus.*

Sphinx nessus, Drury, Ill. Exot. Ins., ii., p. 46, pl. 27, f. 1 (1773).
Sphinx equestris, Fabr., Ent. Syst., iii., p. 365 (1793).
Chœrocampa rubicundus, Schaufuss, Nunquam Otiosus, i., p. 18 (1870).
Moulmein. In B. M.

AMBULICIINÆ.

18. *Ambulyx substrigillis.*

Sphinx (*Ambulyx*) *substrigillis*, Westw., Cab. Or. Ent., p. 61, pl. 30, f. 2 (1848).
Taoo (Tenasserim). In I. M., Calcutta.

SMERINTHIINIÆ.

19. *Cypa decolor.*

Smerinthus decolor, Walker, viii., p. 255 (1856).
Cypa incongruens, Butler, Ill. Typ. Lep. Het., B. M., v., p. 12, pl. 80, f. 8 & 9 (1881).
Tavoy. In I. M., Calcutta.
The type, which is from Darjiling, is in coll Saunders.

20. *Daphnusa ocellaris.*

Daphnusa ocellaris, Walker, viii., p. 238 (1856).
Bassein, August, 1888, in coll. Swinhoe.
Borneo (Type). In B. M., but my specimen is identical.

ACHERONTIINÆ.

21. *Acherontia morta.*

Acherontia morta, Hübn., Verz. Bek. Schm., p. 140 (1816).
Moulmein. In B. M.

SPHINGINÆ.

22. *Protoparce orientalis.*

Protoparce orientalis, Butler, T. Z. S., ix., p. 609, pl. 91, f. 16 & 17 (1876).

Mandalay and Rangoon, March, 1887. In coll. Swinhoe. Moulmein. In B. M.

23. *Diludia vates.*

Diludia vates, Butler, P. Z. S., 1875, p. 13.

Sphinx abictina, Boisd., Hist. Nat. Ins. Sphing., p. 108 (1875).

Moulmein. In B. M.

24. *Calymnia panopus.*

Sphinx panopus, Cram., Pap. Exot., iii., p. 50, pl. 224, figs. A, B (1779).

Rangoon. In coll. Swinhoe.

25. *Nephele hespera.*

Sphinx hespera, Fabr., Syst. Ent., 546, 33 (1775).

Sphinx chiron, Cram., Pap. Exot., ii., pl. 137, f. E (1777).

Sphinx didyma, Fabr., Sp. Ins., ii., 148, 41 (1781).

Sphinx quaterna, Charpentier, Ed. Espers. Aus. Schm. Sph., pl. 1, f. 2 (1830).

Perigonia obliterans, Walker, xxxi., p. 28 (1864).

Mandalay. In coll. Swinhoe.

BOMBYCES.

ÆGERIDÆ.

26. *Ægeria rangoonensis*, n. sp.

Antennæ black, not clavate, slightly falcate, setose beneath, the setæ in patches, palpi bright ochreous, nearly curved, rising a little higher than the head, thickly clothed, brownish at the sides, third joint very short. Eyes black. Top of head and body dark brown, nearly black, with greenish and bronzy tints in certain lights; two bands on the collar, first pale ochreous, second shining dark green; with ochreous stripes on the body, one on each side, and one behind on the thorax, and one on each segment in the abdomen, the middle one indistinct; anal tuft dark greenish black, long and thick. Wings hyaline, tinged with yellow, bands purplish brown, altogether paler than the colour of the body. Fore wing, with

some ochreous marks at the base; a costal band limited by the subcostal vein; a band in the hinder margin slightly thinner than the costal band; a thicker band across end of cell, from the lower end of which it runs sharply forward to the hinder margin near the angle making a sharp inward angle; and an outer marginal band, thickest of all, which deepens upwards, and its inside margin curves on to the costa. Hind wing with a thin band at the end of the cell, a thin costal band and marginal line; fringe on both wings black; wings below paler, more yellowish. Face and pectus pale whitish yellow, with the ochreous bands on each side of the thorax above reaching over on to each side of the pectus. Body dark greenish brown; abdomen with an ochreous central stripe interrupted on the segments. Legs stout, purplish black, edged with glistening greyish white on the inner sides; fore legs with a pale whitish yellow band at the basal joint of the femora; a broad penicillate fringe on the tibiæ, and the tarsi white; middle and hind legs with long reddish tufts on the tibiæ; their tarsi with white bands; middle tibiæ with one long and one short spur at the end; hind tibiæ with two pairs of spurs, one very long and one very short, from the same root, and some very long whitish hairs; all the long spurs brownish, and the short ones white. Expanse of wings, $1\frac{3}{10}$—$1\frac{3}{10}$ inch. Length of body to tips of anal tuft, $1\frac{4}{10}$—$1\frac{1}{2}$ inch.

Rangoon, June and July, 1888. In coll. Swinhoe.

Allied to *Ægeria spheciformis*, Schiff., from the Amur, wings yellower, bands thinner, and body differently banded.

27. *Sciapteron noblei*, n. sp.

Antennæ smooth, ochreous, edged with black at the base, not clavate, slightly falcate. Palpi curved, rising as high as the top of the head, stout, bright ochreous, brown at the sides towards the tips. Eyes black. Head and body shining blue-black; a pale yellowish ring on the collar, and another dark bluish black marked with grey behind it. A golden spot on the fore part of each tegula, some bronzy shades on the thorax and abdomen. Fore wings well clothed and deep purplish black without markings. Hind wings hyaline, with black margins, black veins, and a black band closing the cell; fringe on both wings pale black, much paler than the colour of the fore wings below, wings as above but duller. Proboscis bright ochreous. Body and legs deep shining blue-black. Some long grey hairs on the sides of the abdomen near the base; a large yellow spot in the centre of thorax near the base, and two or three faint yellow spots down the centre of the abdomen. Fore tarsi yellow; middle

femora with a reddish tuft of hairs; middle and hind tarsi with yellowish bands and marks; middle tibiæ with a long and a short spur at the end; hind tibiæ with two long and two shorter spurs (about half the length), one long and one short from each root. Anal tuft long, thick, bright blue-black above and below, and with a bright orange spot below; all the long spurs are brownish, and the short ones white.

The female is of the same general description but of an altogether duller colour, inclining to bronzy greenish. Expanse of wings, $1\frac{5}{10}$ inch. Length of the body to tips of anal tuft, $\frac{9}{10}$ inch.

Rangoon, July and August, 1888. In coll. Swinhoe.

Allied to *S. regale*, Butler, from Japan; differs in the colour of the wings and antennæ, being black and yellow instead of brown and black, and in the body being differently marked.

28. *Sciapteron jucunda*, n. sp.

♂. Palpi pure ochreous, curved, rising as high as the top of the head, well clothed, third joint short. Antennæ ochreous brown, smooth, slightly falcate. Eyes black. Top of head and body dark greenish brown; a band on the collar in front greyish, with a bluish band behind it; a dark ochreous band on each side of the neck. Thorax and abdomen unmarked, except for some crimson marks on the sides of the abdomen near the tip; anal tuft long, thick, and deep crimson. Fore wings more rounded at the tips than in *S. noblei*, well clothed, and of a bronzy brown, with purplish reflections. Hind wings hyaline, veins brown, a brown band closing the cell, outer margin brown, fringe on both wings of the same colour. Under side, wings duller. Body blue black; a yellow patch in the centre of the thorax near the base, and a yellow spot on each segment of the abdomen. Legs blue-black, less clothed than in *S. noblei;* fore tarsi yellow; middle tibiæ with a long and a short spur together at the end, and with a crimson tuft; middle tarsi yellowish on the lower portions; hind tibiæ with two sets of spurs, a long and short one to each set, and with two crimson tufts of hair above; hind tarsi grey with whitish marks; all the long spurs brownish, and the short ones white. Expanse of wings, $1\frac{4}{10}$ inch. Length of body to tip of anal tuft, $1\frac{1}{2}$ inch.

Rangoon, June and July, 1888. In coll. Swinhoe.

Differs chiefly from the preceding species by its bright crimson anal tuft.

29. *Sciapteron gracilis*, n. sp.

♂ ♀. Antennæ ochreous, smooth, slightly falcate. Palpi ochreous, clothed, curved, rising as high as top of the head; third joint short. Eyes brown; two yellow bands behind the eyes. Thorax bronzy, with an ochreous curved band behind. Abdomen greenish black, with two ochreous bands, one on first and one on third segment; anal tuft light ochreous red. Fore wings clothed, and of a pale reddish yellow colour. Hind wings hyaline, with veins, marginal line and band closing end of the cell, pale reddish yellow; fringe on both wings blackish brown. Below, wings same as above, but with a golden tinge. Body greenish black; collar and spots down the centre of the thorax and abdomen, reddish ochreous. Fore legs greenish black, streaked with reddish ochreous, and with the tarsi entirely of that colour; middle and hind femora greenish black, with the remaining portion of the legs reddish ochreous; spurs on the middle and hind legs as in *S. jucunda*, but also reddish ochreous. Expanse of wings, $1\frac{3}{10}$ inch. Length of body to tip of anal tuft, $1\frac{1}{10}$ inch.

Rangoon, July, 1888. In coll. Swinhoe.

Differs from *S. jucunda* in its general reddish coloration, and in its yellow bands on abdomen.

30. *Melittia notabilis*, n. sp. (Pl. VI., fig. 1).

Antennæ black, reddish brown at the tips, stout, slightly clavate, falcate. Palpi brown, covered with white hairs, stout, curved, rising as high as the vertex, last joint very short. Eyes reddish brown. Head, collar, thorax, and first two segments of abdomen (which is very stout), brownish, luteous; remainder of the abdomen dark greenish black, with pale yellowish white thin bands on each segment; anal tuft short, composed of black and white hairs. Wings hyaline, with the veins and fringe reddish brown, and all the bands of that colour. Fore wings with a broad band on the costa, a thinner one on the hinder margin, a band across the wing at the end of the cell, and a broad outer band leaving the hyaline space between attenuated at the upper end; median vein prominent, and thickly covered with scales. Hind wings with only the marginal lines, otherwise it is unmarked. Under side, pectus and face and half the abdomen, a pale chrome yellow; remainder of the body black, with a broad chrome yellow band down the centre to the anal tuft, which is also covered with this colour. Fore and middle legs with yellow and black stripes; a tuft of yellow hairs at the base of the middle femora; the middle tibiæ covered with long hairs; hind legs densely clothed

with long hairs, which continue to the end of the tarsi, and are deep black, with one small and two large yellow patches; one set of spurs on middle tibiæ, and two sets on hind tibiæ, each set composed of a long and a short one. Expanse of wings, $1\frac{6}{10}$ inch. Length of body to tip of anal tuft, $\frac{8}{10}$ inch.

Rangoon, August, 1887. In coll. Swinhoe.

Nearest allied to *M. chalciformis*, Fab., as identified in the British Museum; but is a much stouter insect, and is differently coloured in the body.

31. *Melittia pellecta*, n. sp. (Pl. VI., fig. 2).

Antennæ black, stout, slightly clavate, falcate. Palpi brown, covered with white hairs, stout, curved, rising as high as the vertex, last joint short. Eyes and top of head brown, collar and thorax luteous, tinged with reddish. Abdomen black, the segments marked with white; anal tuft black, short. Fore wings nearly completely clothed, deep black, a thin hyaline line below the cell, from the base nearly to the end of the cell; a short hyaline streak near the end of the cell, and another beyond it, also a small indistinct semi-hyaline streak near the apex, all longitudinal. Hind wings hyaline, veins and marginal lines black; fringe of both wings pale black; under side, wings same as above, but the hind wing in certain lights has a glistening blue tinge. Body and legs black. Face white. Abdomen with a whitish stripe down its centre. Thorax with some white marks. Legs clothed as in *M. notabilis;* fore legs with white stripes; hind legs with a few of the long hairs with white tips, and with some faint blue marks on the tibiæ; one set of spurs on middle tibiæ, and two sets on hind tibiæ, each set composed of a long and a short spur. Expanse of wings, $1\frac{1}{2}$ inch. Length of the body to tip of anal tuft, $\frac{5}{10}$ inch.

Rangoon, August, 1888. In coll. Swinhoe.

Differs from *M. notabilis* in narrow wings and body, and in its blacker coloration.

32. *Melittia congruens*, n. sp. (Pl. VI., fig. 4).

Antennæ reddish, thin, smooth, clavate, falcate, much like the antennæ of a Hesperid. Palpi reddish, first joints thickly clothed with white hairs; second joint thinly clothed with white hairs with brown tips; last joint naked, rather long, half the length of the second. Eyes with the frontal half bronzy, and the hinder half deep black, the two colours quite distinct and well defined. Head, collar, and body, bronzy; some golden hairs at the sides of the

thorax near the base. Abdomen with the sides and anal portions dark greenish black; anal tuft deep black. Wings hyaline, with pale purplish brown veins and bands. Fore wings with a costal band, a thinner band on hinder margin, a band across the wing at the end of the cell, and a broad marginal band, circling on its inner side from the hinder angle round to the costa at one-eighth from the apex. Hind wings with only the marginal lines; fringe on both wings pale purplish brown. Underside wings as above, with a golden tinge. Face and collar white. Thorax pale purplish brown, with pale luteous marks. Abdomen and anal tuft chrome yellow, with black sides. Legs pale purplish brown, with luteous streaks; spurs as in *M. pellecta*, but all of them unusually stout and long; middle tibiæ with some brown and luteous hairs on the lower half; hind tibiæ densely clothed with long reddish hairs; hind tarsi with long black hairs, with a white patch. Expanse of wings, $1\frac{2}{10}$ inch. Length of body to tip of anal tuft, $\frac{8}{10}$ inch.

Rangoon, July, 1888. In coll. Swinhoe.

Its peculiar antennæ and length of spurs separates it from any other species known to me.

33. *Melittia ? volatilis*, n. sp. (Pl. VI., fig. 3).

Antennæ black, reddish at the tips, thin, clavate, falcate. Palpi black, clothed with white hairs, curved, rising as high as the vertex; third joint small. Eyes half bronze and half black, as in *M. congruens*. Collar black. Thorax metallic, lilac purple, body greenish black, the segments edged with pure white; anal tuft black. Fore wings black, round at the tips, almost entirely clothed, except for a hyaline streak below the cell, another along the outer half of the cell, and a small spot towards the hinder angle, in a line with the lower streak. Hind wings hyaline; veins and marginal lines black, and a slight black thickening on the upper half of the vein closing the cell, and some glistening pale cerulean blue scales at the base, where there is a tuft of hairs of the same colour; under side wings as above, but with a glistening blue tint. Face white. Thorax and abdomen black, some white marks on the former. Legs black, with white stripes; middle tibiæ sparsely clothed with short black bristles; hind tibiæ, with longish black hairs, with two white spots, and with white tips to some of the hairs; spurs, as in *M. pellecta*, but slender, and the short ones very slender and short. Expanse of wings, 1 inch. Length of the body to tip of anal tuft, $\frac{6}{10}$ inch.

Rangoon, August, 1888. In coll. Swinhoe.

Allied to nothing that I know of; is sub-generically distinct from any other species of this family known to me.

34. *Melittia eurytion.*

Trochilium eurytion, Westw., Cab. Or. Ent., p. 62, pl. 30, f. 5 (1848).

Rangoon. In coll. Swinhoe.

35. *Pramila minuta*, n. sp. (Pl. VI., fig. 5).

Antennæ brown. Palpi flesh colour, white below, brownish at the tips, slender, curved, rising higher than the head; last joint long, two thirds length of the second. Eyes black; band behind greyish white. Body dark olive green. A pure white spot on each side of the thorax at base of fore wings. Abdomen with grey and green bands, two or three of them edged with pure white; anal tuft composed of white and brown hairs. Fore wing with all the veins deep black, the cell and lower interspace hyaline; costa and hinder margin black; and this colour prevails in the whole space beyond the cell, which is closed by a black line and another parallel line just beyond it, the space between these lines being chrome yellow; and outside the outer black line is a fine line composed of hyaline spaces between the veins, running almost up to the apex. Hind wings hyaline, veins, outer lines, and a band closing the cell, black; fringe on both wings black; below, wings as above, but with a glistening purplish golden tinge. Body and legs black. Thorax with white marks. Abdomen with white bands on each segment. Tibiæ and tarsi with broad white bands; one set of spurs in middle and two sets in hind tibiæ, each set composed of two long and one short one. Expanse of wings, $\frac{9}{10}$ inch. Length of body to tip of anal tuft, $\frac{1}{2}$ inch.

Rangoon, June, 1888. In coll. Swinhoe.

I do not know what this insect's nearest described ally is, the neuration on both wings is quite different to the *Sciapteron* above described, and so are the spurs in the legs. I put it provisionally in the genus *Pramila*, to which it is nearest allied.

SYNTOMIDÆ.

36. *Euchromia orientalis.*

Euchromia orientalis, Butler, Journ. Linn. Soc. Lond., 1876, p. 364.

Rangoon, December, 1886. In coll. Swinhoe.

37. *Euchromia fraterna.*

Euchromia fraterna, Butler, Journ. Linn. Soc., Lond., 1876, p. 364.

(Type). Moulmein. In B. M.

38. *Phauda flammans.*

Euchromia (Phauda) flammans, Walker, i., p. 257 (1854).

Bassein, October, 1887. In coll. Swinhoe.

39. *Artona fulvida.*

Artona fulvida, Butler, Journ. Linn. Soc., Lond., 1876, p. 356.

(Type). Moulmein. In B. M.

40. *Artona nigrescens.*

Artona nigrescens, Butler, Journ. Linn. Soc., Lond., 1876, p. 356.

Rangoon, October, 1888. In coll. Swinhoe.

41. *Syntomis albifrons.*

Syntomis albifrons, Moore, P. Z. S., 1878, p. 845, pl. 53, f. 6.

Tenasserim. In coll. Moore.

42. *Syntomis atkinsoni.*

Syntomis atkinsoni, Moore, P. Z. S., 1871, p. 245, pl. 18, f. 2.

Mergui, Rangoon, July, 1888. In coll. Swinhoe.
Tenasserim. In I. M., Calcutta.
Moulmein and Tenasserim. In B. M.

43. *Syntomis berinda.*

Syntomis berinda, Moore, P. Z. S., 1878, p. 845, pl. 53, f. 8.

Tenasserim. In coll. Moore.

44. *Syntomis disrupta.*

Syntomis disrupta, Moore, P. Z. S., 1878, p. 845, pl. 53, f. 5.

Tenasserim. In I. M., Calcutta.

45. *Syntomis fervida.*

Syntomis fervida, Walker, i., p. 131 (1854).
Moulmein. In B. M.

46. *Syntomis grotei.*

Syntomis grotei, Moore, P. Z. S., 1871, p. 245, pl. 18, f. 4.
Tenasserim. In I. M., Calcutta.

47. *Syntomis libera.*

Syntomis libera, Walker, xxxi., p. 78 (1864).
Upper Tenasserim. In I. M., Calcutta.

48. *Syntomis masoni.*

Syntomis masoni, Moore, P. Z. S., 1878, p. 845, pl. 53, f. 4.
Tenasserim. In I. M., Calcutta.

49. *Syntomis sladeni.*

Syntomis sladeni, Moore, P. Z. S., 1871, p. 245, pl. 18, f. 5.
Tenasserim. In coll. Moore.

50. *Syntomis pectoralis.*

Syntomis pectoralis, Walker, i., p. 133 (1854).
(Type). Moulmein. In B. M.

51. *Syntomis volans*, n. sp. (Pl. VI., fig. 6).

Antennæ, palpi, head, and body black. Abdomen with a broad golden ring encircling each segment. Wings hyaline ; fore wing broad, long; hind wing very small; wings quite uncoloured; veins black; costal and marginal lines black, thickest on hind border, and all round the hind wing ; marginal line on both wings slightly dentated inwards on the veins. Tip of fore wings with a black patch, and the hyaline part on the costa towards the base visible between it and the subcostal vein. Underside black. Legs black. Expanse of wings, $1\frac{2}{10}$ inch.

Karen Hills, April, 1887. In coll. Swinhoe.

Looks superficially somewhat like *Hydrusa discinota*, Moore, but is differently marked, and the neuration is different, the two radial veins on the fore wing being well separated as in the genus *Syntomis*, and not close together as in that sub-genus.

52. *Notioptera properta.*

Notioptera properta, Swinhoe, P. Z. S., 1889, p. 400, pl. 43, f. 6.

Rangoon, June, 1886 and 1888. In coll. Swinhoe.

AGARISTIDÆ.

53. *Eusemia albomarginata.*

Eusemia albomarginata, Moore, P. Z. S., 1872, p. 569.

Rangoon. In coll. Swinhoe.

54. *Eusemia adulatrix.*

Eusemia adulatrix, Kollar, Hüg. Kasch., iv., p. 464, pl. 20, f. 1 (1846).

Eusemia bellatrix, Westw., Cab. Or. Ent., p. 67. pl. 33, f. 2 (1848).

Moulmein. In B. M.

Pegu, June. Rangoon, May, 1886, in coll. Swinhoe.

55. *Eusemia communis.*

Eusemia communis, Butler, Ann. Mag. N. H., 4, xv., p. 140, pl. 13, f. 1 (1875).

Rangoon, May, 1886. In coll. Swinhoe.

56. *Eusemia vulcania.*

Eusemia vulcania, Butler, Ent. Mo. Mag., Lond., xii., p. 123 (1875).

Prome, May, 1887. In coll. Swinhoe.

57. *Eusemia accurata.*

Eusemia accurata, Swinhoe, P. Z. S., 1889, p. 401.

Moulmein, June, 1888. In coll. Swinhoe.

58. *Ægocera tripartita.*

Ægocera tripartita, Kirby, Proc. Roy. Dublin Soc. (2), ii., p. 340 (1880).

Thyetmyo, October and November, 1887, in coll. Swinhoe.

59. *Seudyra dissimilis*, n. sp.

Fore wings reddish chocolate brown, costal and inner portions irrorated with grey; some slender transverse lines and the median vein grey; two large grey rings, the first round, above and just before termination of median vein; the other larger, oblique,

and bent in at the sides, a broad white discal band from costa one-third from apex to hinder margin. Hind wing luteous, with a broad blackish brown band sinuous on its inner margin. Thorax chocolate brown. Abdomen luteous, with a dorsal row of brown marks. Expanse of wings, 1½ inch.

Mandalay. In coll. Swinhoe.

Allied to *S. transiens*, Walker, but smaller, and can easily be distinguished by the absence of the two white discal lines beyond the white discal band, and in having no brown cell spot on the hind wings.

CHALCOSIIDÆ.

60. *Trypanophora humeralis.*

Syntomis humeralis, Walker, vii., p. 1593 (1856).

Tavoy. In I. M., Calcutta.

61. *Heterusia distincta.*

Gynautocera distincta, Guérin, Voy. Deless. Nat. Hist., p. 85, pl. 24, f. 3 (1843).

Mergui. In I. M., Calcutta.

62. *Soritia pulchella.*

Chalcosia pulchella, Kollar, Hüg. Kasch., p. 461 (1848).

Moulmein. In B. M.

63. *Pintia drataraja.*

Eterusia drataraja, Moore, Cat. Lep. E. I. C., ii., p. 321, pl. 8 *a*. f. 3 (1859)

Mergui. In I. M., Calcutta.

64. *Pintia cyanea.*

Pintia cyanea, Butler, Ann. Mag. N. H. (5), xii., p. 160 (1883).

Mergui. In I. M., Calcutta.

65. *Epyrgis binghami.*

Epyrgis binghami, Butler, Ann. Nat. Hist. (5), x., p. 374 (1882).

Tenasserim. In B. M.

66. *Epyrgis imitans.*

Epyrgis imitans, Butler, Ill. Typ. Lep. Het., v., p. 24, pl. 84, f. 1 (1881).

Karen Hills, April, 1887. In coll. Swinhoe.

67. *Epyrgis papilionaris.*

Phalæna papilionaris, Drury, Ins. Exot., ii., p. 4, pl. 2, f. 4 (1773).

Phalæna venaria, Fabr., Ent. Syst., iii., 2, 156, 96 (1794).

Moulmein. In B. M.

Mergui. In coll. Swinhoe.

68. *Epyrgis parvula.*

Epyrgis parvula, Butler, Ann. Mag. N. H. (5), xii., p. 160 (1883).

Burma. In coll. Swinhoe.

69. *Cyclosia panthona.*

Phalæna panthona, Cram., Pap. Exot., iv., pl. 322, f. C (1780).

Moulmein. In B. M.

Mergui. In coll. Swinhoe.

70. *Laurion gemina.*

Laurion gemina, Walker, ii., p. 427 (1854).

Mergui. In I. M., Calcutta.

71. *Codane zelica.*

Gynautocera (*Chalcosia*) *zelica*, Doubleday, Ann. Mag. N. H. (1), xix., p. 76, pl. 7, f. 3 (1847).

Moulmein. In B. M.

72. *Codane zenotea.*

Pidorus zenotea, Doubleday, M. S., Walker, ii., p. 425 (1854).

Karen Hills, April, 1887. In coll. Swinhoe.

Moulmein, in B. M.

73. *Codane neoterica*, n. sp.

Antennæ, head, and fore part of thorax dark green; remainder of thorax and abdomen golden yellow. Wings pure white, bands pale chocolate-brown. Fore wings, with a thin band on the costa, thickest in the basal half; a broad central band, its outer margin nearly erect, its inner margin sinuous and widening upwards on to the costa; a broad outer band, its inner margin extending from the hinder margin near the hinder angle to the costa, one third from the apex, and slightly circling towards the apex in its centre; in this margin are two large white subapical spots one below the other; a larger submarginal central white spot and some white median veinlets; also a broad grey shade on the basal half of the hinder margin. Hind wings with a thin central band, a broad marginal band, which fines down and abruptly terminates at one third from the anal angle. Below as above, but the central band on the fore wings is broken into a patch from the costa and a spot below it. Body and legs golden yellow; legs with brown stripes. Abdomen with a row of brown spots on each side. Expanse of wings, $2\frac{3}{10}$ inch.

Rangoon, 1887. In coll. Swinhoe.

Allied to *C. leucomelas*, Moore; differs in the broader central band, thus leaving a much narrower area between it and the outer border, which is also broader at the hinder angle. In the hind wing it differs in not having the white apical spot.

74. *Scaptesyle tricolor.*

Scaptesyle tricolor, Walker, ii., p. 378 (1854).

Burma. In coll. Swinhoe.

75. *Thymara caudata.*

Thymara caudata, Moore, P. Z. S., 1879, p. 394, pl. 32, f. 3.

Burma. In coll. Moore.

76. *Histia cometaris.*

Histia cometaris, Butler, Ann. Mag. N. H. (5), x. p. 374 (1882).

Tenasserim. In B. M.

77. *Gynautocera papilionaria.*

Gynautocera papilionaria, Guérin, Mag. Zool., 1830, p. 12.

Bassein, October, 1887. In coll. Swinhoe.

78. *Pompelon velentula.*

Pompelon velentula, Swinhoe, P. Z. S., 1889, p. 401.

Burma. In coll. Swinhoe.

NYCTEMERIDÆ.

79. *Nyctemera coleta.*

Phalæna coleta, Cram., Pap. Exot., iv., pl. 368, f. H. (1781).

Rangoon, October, 1888. In coll. Swinhoe.

80. *Nyctemera lacticinea.*

Phalæna (*Geometra*) *lacticinea*, Cram. Pap. Exot., ii., pl. 128, f. E (1777).

Burma. In B. M.

81. *Nyctemera latistriga.*

Nyctemera latistriga, Walker, ii., p. 397 (1854).

Bassein, October, 1887; Rangoon, October, 1888.
Hypongadon, October, 1886. In coll. Swinhoe.
Moulmein. In B. M.

82. *Nyctemera tripunctaria.*

Phalæna tripunctaria, Linn., Mus. Lud. Ulr., p. 392 (1764).

Nyctemera atralba, Hübn., Verz. Bek. Schmett., p. 170 (1816).

Tavoy. In I. M., Calcutta.

83. *Pitasila moolaica.*

Pitasila moolaica, Moore, P. Z. S., 1878, p. 847, pl. 53, f. 10.

Tenasserim. In I. M., Calcutta.

84. *Pitasila varians.*

Nyctemera varians, Walker, ii., p. 400 (1854).

Rangoon, April and August, 1886; Karen Hills, April, 1887. In coll. Swinhoe.

85. *Pterothysanus noblei.*

Pterothysanus noblei, Swinhoe, P. Z. S., 1889, p. 401, pl. 44, fig. 3.

Prome, May, 1887. In coll. Swinhoe.

CALLIDULIDÆ.

86. *Datanga minor.*

Datanga minor, Moore, Descr. Ind. Lep. Atk., i., p. 21 (1879).

Moulmein. In coll. Moore.

LITHOSIIDÆ.

HYPSINÆ.

87. *Peridrome orbicularis.*

Hypsa (*Peridrome*) *orbicularis*, Walker, ii., p. 445 (1854).
Aganopis subquadrata, Herr.-Schäff., Lep. Sp. Nov., p. 70 (1856).

Rangoon, April, May and August, 1886. In coll. Swinhoe.
Tenasserim. In I. M., Calcutta.
(Type). Moulmein. In B. M.

88. *Anagina subfascia.*

Hypsa (*Anagina*) *subfascia*, Walker, ii., p. 446 (1854).

Moulmein. In B. M.
Tenasserim, Tavoy. In coll. Moore.
Rangoon, March, April & May, 1886. In coll. Swinhoe.

89. *Euplocia membliaria.*

Phalæna membliaria, Cram., Pap. Exot., iii., pl. 269, figs. C, D (1780).

(Type). Moulmein. In B. M.

90. *Neochera marmorea.*

Hypsa (*Neochera*) *marmorea*, ♀, Walker, vii., p. 1674 (1856).

Neochera bhawana, ♂, Moore, Cat. Lep. E. I. C., ii. p. 295, pl. 7, f. 4, (1859).

Moulmein. In B. M.

Pegu, July; Rangoon, April, May, September and October, 1885-6. In coll. Swinhoe.

91. *Hypsa heliconia.*

Phalæna heliconia, ♂, Linn., Syst. Nat., x., p. 511 (1758).

P. monycha, ♀, Cram., Pap. Exot., ii., pl. 131, f. C (1777).

Hypsa doryca, Walker, ii., p. 459 (1854).

Moulmein, in B. M.

Rangoon, October, 1886 and 1888; Bassein, October, 1887. In coll. Swinhoe.

92. *Hypsa persecta.*

Hypsa persecta, Butler, Trans. Ent. Soc. Lond., 1875, p. 317.

H. lacteata, Butler, Ill. Typ. Lep. Het. B. M., v., p. 43, pl. 87, f. 9 (1881).

Rangoon, October, 1888. In coll. Swinhoe.

93. *Hypsa subsimilis.*

Hypsa subsimilis, Walker, xxxi., p. 212 (1864).

Tenasserim. In I. M., Calcutta.

94. *Hypsa venalba.*

Hypsa venalba, Moore, P. Z. S., 1877, p. 598.

Upper Tenasserim, August. In coll. Swinhoe.

95. *Damalis alcifron.*

Phalæna alcifron, Cram. Pap. Exot. ii., pl. 133, f. E (1777).

Noctua caricæ, Fabr., Ent. Syst., iii., 2, p. 27, 63 (1794).

Moulmein, in B. M.

Rangoon, May and August 1886, October, 1888. In coll. Swinhoe.

96. *Damalis egens.*

Hypsa (*Damalis*) *egens*, Walker, ii., p. 453 (1854)
Moulmein, in B. M.
Rangoon, January, 1887. In coll. Swinhoe.

97. *Damalis javana.*

Phalæna javana, Cram., Pap. Exot., iii., pl. 274, f. C (1780).
Moulmein. In B. M.

98. *Damalis plaginota.*

Hypsa plaginota, Butler, Trans. Ent. Soc. Lond., 1875, p. 320.
Tenasserim. In I. M., Calcutta.

99. *Damalis strigivenata.*

Damalis strigivenata, Butler, Trans. Ent. Soc. Lond., 1875, p. 321.
Tavoy. In I. M., Calcutta.

100. *Philona cinerascens.*

Hypsa (*Philona*) *cinerascens*, Moore, P. Z. S., 1877, p. 598, pl. 59, f. 6.
Upper Tenasserim, August. In coll. Swinhoe.

101. *Digama figurata.*

Digama figurata, Moore, P. Z. S., 1878, p. 5.
(Type). Burma. In coll. Moore.

LITHOSIINÆ.

102. *Macrobrochis leucospilota.*

Macrobrochis leucospilota, Moore, P. Z. S., 1878, p. 8.
Rangoon, June, 1886. In coll. Swinhoe.

103. *Œonistis entella.*

Phalæna entella, Cram., Pap. Exot., iii., pl. 208, f. D (1779).
Tenasserim. In coll. Moore.

104. *Lyclene humilis.*

Cyllene humilis, Walker, ii., p. 544 (1854).
Moulmein. In B. M.

105. *Nepita frigida.*

Doliche frigida, Walker, ii., p. 530 (1854).
Moulmein. In B. M.

106. *Nudaria dasara.*

Setina dasara, Moore, Cat. Lep. E. I. C., ii. p. 303 (1859).
Rangoon, September, 1888. In coll. Swinhoe.

107. *Sesapa undulosa.*

Cyllene undulosa, Walker, ii., p. 545 (1854).
Moulmein. In B. M.

108. *Barsine coccinea.*

Barsine coccinea, Moore, Journ. As. Soc. Beng., lv., (2), i., p. 98 (1886).
Tavoy. In I. M., Calcutta.

109. *Bizone bianca.*

Bizone bianca, Walker, vii., p. 1684 (1856).
Rangoon, May, 1886. In coll. Swinhoe.

110. *Bizone pallens.*

Bizone pallens, Butler, Trans. Ent. Soc. London, 1877, p. 338.
Moulmein. In B. M.

111. *Bizone peregrina.*

Bizone peregrina, Walker, ii., p. 551 (1854).
Moulmein. In B. M.

112. *Tatargyna picta.*

Deiopeia picta, Walker, xxxi., p. 263 (1864).
(Type). Moulmein. In B. M.
Prome, May, 1887. In coll. Swinhoe.

113. *Argina cribraria.*

Phalæna cribraria, Clerck, Icon. Inns., ii., pl. 54, f. 4, (1759—64).
P. (Noctua) astrea, Drury, Ill., ii., p. 11, pl. 6, f. 3 (1773).
Bombyx pylotis, Fabr., Syst. Ent., p. 585 (1775).
Argina notata, Butler, Trans. Ent. Soc. Lond., 1877, p. 365.

Mergui. In I. M., Calcutta.

114. *Argina dulcis.*

Deiopeia dulcis, Walker, ii., p. 569 (1854).
Argina guttata, Rambur, Faune de l'Andalousie, ii., p. 229 (1866).

Moulmein. In B. M.

115. *Argina pardalina.*

Deiopeia pardalina, Walker, xxxi., p. 263 (1864).

Moulmein. In B. M.

116. *Deiopeia thyter.*

Deiopeia thyter, Butler, Trans. Ent. Soc. Lond., 1877, p. 361.

Burma. In B. M.

117. *Hemonia dulcicula*, n. sp.

Antennæ, head, and front of thorax, bright chrome yellow; a broad band of the same colour extending from the base along the costa and outer border of the fore wings to the hinder angle, where it suddenly becomes narrow; remainder of the thorax and of the fore wings dark pinkish purple. Abdomen and hind wings of the same tone of colour but much paler, and with the outer portions of the hind wings yellowish, broadly so at the apex. Below, fore wings paler; hind wings, body and legs, yellowish. Expanse of wings, $\frac{5}{10}$—$\frac{6}{10}$ inch.

Rangoon, May, 1888. In coll. Swinhoe.

Easily distinguishable from *H. orbiferana*, Walker, by its well-defined yellow border on costa and outer margin of fore wings, and by its much smaller size.

118. *Pseudoblabes oophora.*

Pseudoblabes oophora, Zeller, Bull. Soc. I. N. Mosc., 1853, p. 514, pl. 4, f. 1—6.

Rangoon. In coll. Moore.

119. *Ræselia fragilis*, n. sp.

White. Body and fore wings sparsely covered with black irrorations. Fore wings with the entire costa marked with pale black marks; an ante-medial black band, which fines downwards from the costa, and stops about two thirds the breadth of the wing; a post-medial broad black band, with slightly sinuous borders, the inner border being in the middle of the wing; and a submarginal sinuous pale black line, which curves inwards on to the costa. Fringe pale black. Hind wings pure white, unmarked. Under side grey, shining; medial band on fore wings showing through. Body and legs brownish. Expanse of wings, 4½-10ths inch.

Rangoon, August, 1888. In coll. Swinhoe.

Allied to *Ræselia pascua*, Swinhoe, but from which it can at once be distinguished by its broad black band on fore wings, which occupies one-fifth of the space of the wing.

ARCTIIDÆ.

120. *Spilarctia rubescens.*

Spilosoma rubescens, Walker, iii., p. 677 (1855).

Moulmein. In B. M.

121. *Spilarctia ummera.*

Spilarctia ummera, Swinhoe, P. Z. S., 1889, p. 405, pl. 43, fig. 1.

Bassein, October, 1887. In coll. Swinhoe.

122. *Phissama transiens.*

Spilosoma transiens, ♀, Walker, iii., p. 675 (1855).
Amphissa vacillans, ♂, Walker, iii., p. 685.
Aloa isabellina, Walker, iii., p. 705.

Moulmein. In B. M.

Rangoon. In coll. Swinhoe.

It is impossible to separate the above, the types look distinct enough; but I have intermediates of many shades of colour and difference in markings from the same localities.

123. *Creatonotos interrupta.*

Phalæna interrupta, Linn., Syst. Nat. Phal., i., v., p. 2553.

Bombyx francisca, Fabr., Mant. Ins., ii., p. 131 (1787).

Moulmein. In B. M.

Rangoon, May, June and July, 1886. In coll. Swinhoe.

124. *Rajendra tripartita.*

Aloa tripartita, Walker, iii., p. 706 (1855).

Moulmein. In B. M.

Rangoon, August and September, 1886. In coll. Swinhoe.

125. *Rajendra vittata.*

Rajendra vittata, Moore, P. Z. S., 1879, p. 396, pl. 32, f. 12.

(Type). Lower Burma. In coll. Moore.

126. *Tinolius zingha*, n. sp. (Pl. VI., fig. 12).

Palpi, antennæ, head, thorax, and fore wings, ochreous brown; antennæ nearly as long as the abdomen. Abdomen pinkish ochreous, bright crimson down the centre, but is somewhat rubbed. Fore wings ochreous fawn colour, tinged with pinkish; with one large white spot within the cell in the centre, and another at the end of the cell outside, where the median branches are emitted. Hind wings paler and pinkish towards the base and abdominal margins. Underside, both wings of a uniform pale ochreous grey, tinged with pinkish and quite unmarked. Expanse of wings, $2\frac{1}{10}$ inch.

Beeling, April, 1886. In coll. Swinhoe.

Allied to *T. eburneigutta*, Walker, but differs in its paler coloration; inordinately long antennæ, and has only two spots on the fore wing, whereas *T. eburneigutta* has three large ones in the centre, and two on the hinder margin.

127. *Tinolius eburneigutta.*

Tinolius eburneigutta, Walker, iii., p. 621 (1855).

Rangoon, April, July and September, 1888. In coll. Swinhoe.

128. *Hypercompa principalis.*

Euprepia principalis, Kollar, Hüg. Kasch., iv., p. 465, pl. 20, f. 2 (1848).

Pegu. In coll. Swinhoe.

129. *Attatha regalis.*

Hypercompa regalis, Moore, P. Z. S., 1872, p. 575, pl. 33, f. 7.

Meetan. In coll. Moore.

130. *Aloa insolata.*

Aloa insolata, Swinhoe, P. Z. S., 1889, p. 404, pl. 43, fig. 15.

Thyetmyo, September, 1887. In coll. Swinhoe.

131. *Aloa lactinea.*

Phalæna lactinea, Cram., Pap. Exot., ii., pl. 133, f. D (1777).

Bombyx sanguinolenta, Fabr., Ent. Syst., iii., 473, 206 (1793).

Rangoon, May, 1886. In coll. Swinhoe.

LIPARIDÆ.

132. *Orgyia postica.*

Lacida postica, Walker, iv., p. 803 (1855).

Moulmein. In B. M.

133. *Lælioides rubripennis.*

Lælioides rubripennis, Moore, Trans. Ent. Soc. Lond., 1884, p. 358.

(Type) Burma. In coll. B. M.

134. *Lælia angulifera.*

Prorodeca angulifera, Walker, iv., p. 919 (1855).

(Type). Moulmein. In B. M.

Mergui. In I. M., Calcutta.

135. *Genusa bigutta.*

Genusa bigutta, Walker, iv., p. 818 (1855).

Moulmein. In B. M.

136. *Genusa terminata.*

Genusa terminata, Walker, xxxii., p. 340 (1864).

Karen Hills, April, 1887 ; Beeling, March, 1888. In coll. Swinhoe.

137. *Artaxa atomaria.*

Artaxa atomaria, Walker, iv., p. 796 (1855).
(Type). Moulmein. In B. M.

138. *Artaxa digramma.*

Bombyx digramma, Boisd., Icon. R. Anim. Ins., p. 508, pl. 86, f. 4 (1829—38).
Moulmein. In B. M.

139. *Artaxa flavinata.*

Artaxa flavinata, Walker, xxxii., p. 331 (1865).
Moulmein. In B. M.

140. *Artaxa pusilla.*

Artaxa pusilla, Moore, Lep. Ceylon, ii., p. 86, pl. 112, f. 4 (1882).
Rangoon, May, 1887. In coll. Swinhoe.

141. *Artaxa varians.*

Artaxa varians, Walker, iii., p. 796 (1855).
Moulmein. In B. M.
Mergui. In I. M., Calcutta.

142. *Somena subnotata.*

Orvasca subnotata, Walker, xxxii., p. 502 (1865).
Rangoon. In Phayre Museum, Rangoon.

143. *Porthesia virguncula.*

Euproctis virguncula, Walker, iv., p. 836 (1855).
Moulmein. In B. M.

144. *Porthesia marginalis.*

Euproctis marginalis, Walker, vii., p. 1731 (1856).
Mergui. In I. M., Calcutta.

145. *Euproctis atomaria.*

Euproctis atomaria, Walker, iv., p. 837 (1855).
Mergui. In I. M., Calcutta.

146. *Euproctis bigutta.*

Euproctis bigutta, Walker, iv., p. 837 (1855).
Mergui. In I. M., Calcutta.

147. *Euproctis immaculata.*

Euproctis immaculata, Moore, Trans. Ent. Soc. Lond., 1884, p. 358.
Rangoon, October, 1886. In coll. Swinhoe.

148. *Chærotricha plana.*

Euproctis plana, Walker, vii., p. 1731 (1856).
Hpongalaoo, June, 1886. In coll. Swinhoe.

149. *Chærotricha varia.*

Euproctis varia, Walker, iv., p. 840 (1855).
Mergui. In I. M., Calcutta.

150. *Procodeca angulifera.*

Prorodeca angulifera, Walker, iv., p. 919 (1855).
(Type). Moulmein. In B. M.
Mergui. In I. M. Calcutta.

151. *Lymantria asoetria.*

Lymantria asoetria, Hübn., Samml. Exot. Schm., 2, figs. (1—4).
Moulmein. In B. M.
Tavoy. In I. M., Calcutta.

152. *Patana dispar.*

Patana dispar, Walker, iv., p. 820 (1855).
(Type). Moulmein. In B. M.
Tongloo; Rangoon, October, 1886. In coll. Swinhoe.

153. *Numenes siletti.*

Numenes siletti, Walker, iii., p. 663 (1855).
N. insignis, Moore, Cat. Lep. E. I. C., ii., p. 367, pl. x., *a*, f. 6 (1859).
Tavoy. In I. M., Calcutta.
Rangoon, December, 1885. In coll. Swinhoe.

NOTODONTIDÆ.

DICRANURINÆ.

154. *Stauropus indicus.*

Stauropus indicus, Moore, P. Z. S., 1879, p. 404.

Rangoon, November, 1886. In coll. Swinhoe.

PHALERINÆ.

155. *Ramesa tosta.*

Ramesa tosta, Walker, v., 1017 (1855).

Pyentaza, April, 1888. In coll. Swinhoe.

156. *Hyperæschra annulata*, n. sp. (Pl. VI., fig. 15).

♀. Pinkish grey; palpi brown at the sides, last joint with the upper part brown with pale tips. Fore wings shaded with brown on the upper, lower, and outer parts, and with pink in the disc; some brownish longitudinal streaks in the centre, and some deep black short subapical streaks connected with a blackish shade straight across the wing towards the centre of the hinder margin; two short brown subcostal central streaks, two curved and distorted brown lines edged with paler colour across the wing, ante-medial and post-medial, and between them two large brown rings edged outwardly with paler colour, the outer the larger, and anterior ring the size of the first, outside the outer line, all three rings nearly in a line, the outermost one with a pinkish centre; a submarginal sinuous pale line, a marginal brown line with a pale inner edge; cilia with brown patches and a central pale line. Hind wings brownish, paling in the costa; cilia pale yellowish grey, with a brown interlined patch at the anal angle. Abdomen grey. Expanse of wings, 1½ in.

Thyetmyo, October, 1887. In coll. Swinhoe.

Differs much from *H. pallida*, Butler, the only other described Indian species of this genus, in its smaller size, rounded apex, and ring-marks on fore wings.

NOTODONTINÆ.

157. *Antheua servula.*

Phalæna servula, Drury, Ins. Exot., ii., p. 20, pl. 11, f. 4 (1773).

Antheua discalis, Walker, iii., p. 767 (1855).

A. exanthemata, Moore, Lep. Ceylon, ii., p. 111, pl. 119, f. 2 (not pl. 104), (1882).

Rangoon, July, 1888. In coll. Swinhoe.

Mr. Moore has pointed out to me the fact that Drury's figure of *P. servula* is undoubtedly the same as Walker's *A. discalis*, a common insect in the East.

158. *Thiacidas postica.*

Thiacidas postica, Walker, v., p. 1028 (1855).

Thyetmyo, 1887. In coll. Swinhoe.

159. *Cleapa latifascia.*

Cleapa latifascia, Walker, v., p. 1037 (1855).

(Type). Moulmein. In B. M.

160. *Bireta longivitta.*

Bireta longivitta, Walker, vii., p. 1754 (1856).

Rangoon. In Phayre Museum, Rangoon.

CALPINÆ.

161. *Oræsia emarginata.*

Noctua emarginata, Fabr., Ent. Syst., iii., 2, 82, 240 (1794).
Oræsia alliciens, Walker, xii., p. 944 (1857).
O. tentans, Walker, *l. c.*

Rangoon, November, 1888. In coll. Swinhoe.

DREPANULIDÆ.

162. *Drepana argenteola.*

Drepana argenteola, Moore, Cat. Lep. E. I. C., ii., p. 369 (1859).

Rangoon, August, 1886. In coll. Swinhoe.

163. *Oreta extensa.*

Oreta extensa, Walker, v., p. 1166 (1855).

(Type). Moulmein. In B. M.

164. *Oreta vatama.*

Oreta vatama, Moore, P. Z. S., 1865, p. 816.

Pegu. In coll. Swinhoe.

165. *Somatina anthophilata.*

Somatina anthophilata, Guén., Phal., ii., 11, 907, pl. 18, f. 2 (1857).

Moulmein. In B. M.
Rangoon, July and November, 1888. In coll. Swinhoe.

166. *Problepsis deliaria.*

Argyris deliaria, Walker, xxiii., p. 808 (1861).

Moulmein. In B. M.

LIMACODIDÆ.

167. *Scopelodes testacea.*

Scopelodes testacea, Butler, Ill. Typ. Lep. Het. B. M., vi., p. 3, pl. 101, f. 5 (1886).

Moulmein. In B. M.

168. *Natada rufescens.*

Natada rufescens, Walker, v., p. 1109 (1855).

Rangoon, May, 1886. In coll. Swinhoe.

169. *Thosea rara.*

Thosea rara, Swinhoe, P. Z. S., 1889, p. 408, pl. 43, fig. 9.

Thyetmyo, October, 1887. In coll. Swinhoe.

170. *Thosea unifascia.*

Thosea unifascia, Walker, v., p. 1068 (1855).

(Type). Moulmein. In B. M.
Bhamo, October, 1882; Rangoon, August and October, 1886. In coll. Swinhoe.

171. *Parasa bandura.*

Parasa bandura, Moore, Cat. Lep. E. I. C., ii., p. 417, pl. 11*a*, f. 9 (1859).

Rangoon, 1886 and 1887. In coll. Swinhoe.

172. *Parasa bicolor.*

Neœra bicolor, Walker, v., p. 1142 (1855).

Moulmein. In B. M.
Bassein, August, 1888. In Phayre Museum, Rangoon.
Rangoon, September, 1886. In coll. Swinhoe.

173. *Parasa dharma.*

Parasa dharma, Moore, Cat. Lep. E. I. C., ii., p. 414, pl. 11*a*, f. 7 (1859).

Rangoon. In coll. Swinhoe.

174. *Parasa mirza*, n. sp. (Pl. VI., fig. 14).

♀. Antennæ and palpi reddish brown. Thorax grass-green; top of head and sides of thorax pale greyish yellow. Fore wings chocolate-colour, with a broad grass-green band across the middle, with both borders slightly curved into the band in their centres. Abdomen and hind wings greyish yellow; under side yellowish, unmarked. Fore wings palest. Legs with some brown stripes. Expanse of wings, $1\frac{1}{10}$ in.

Thyetmyo, 1887. In coll. Swinhoe.

Nearest to *P. hilaris*, Westwood; chiefly differs in the much narrower green band of the fore wings, the outer border of which is also differently shaped.

175. *Susica pallida.*

Susica pallida, Walker, v., p. 1114 (1855).

(Type). Moulmein. In B. M.

176. *Susica? cepphica*, n. sp.

♂. Pinkish brown. Antennæ, palpi, head, and thorax dark brown; antennæ pectinated with short bristles to the tips. Fore wings pale pinkish brown, suffused with dark brown in parts, especially towards the base, costa, and outer margins, forming

bands in the two latter, a submarginal sinuous brown line limiting the marginal band; an ear-shaped large greyish mark in the disc, margined with brown, a similar mark on the hinder margin in its centre. Abdomen and hind wings more brownish; hind wings unmarked; abdomen paler towards the base; under side pale brown, unmarked.

♀. Of a similar character; antennæ also with similar pectinations; the ear-shaped marks on the fore wing are, however, hardly visible and often absent, the brown suffusion more uniform, and the general coloration varying, some being much darker than others. Expanse of wings, $\frac{7}{10}$ in.

Bhamo, October, 1882; Rangoon, July and August, 1888. In coll. Swinhoe.

I do not know where to put this insect; it is nearest allied to *Susica*, but really does not belong to this genus, and I know of no near allies.

177. *Narosa lacteola*, n. sp.

♂. Milky white; palpi at the sides and antennæ pale reddish ochreous; abdomen at the sides and tips lightly tinged with that colour. Fore wings with a minute black dot at the lower end of cell, and another in the margin below the apex; six transverse indistinct and incomplete pale reddish ochreous bands, the basal one the darkest, and paling towards the margin. Hind wings slightly tinged with the same colour, unmarked; under side with the fore and middle legs and central margin of fore wings tinged with pale reddish ochreous. Expanse of wings, $\frac{9}{10}$ in.

Rangoon, October, 1888. In coll. Swinhoe.

Differs from *N. adala*, Moore, its nearest ally, in having the reddish ochreous bands dispersed transversely, instead of obliquely from the base to the costa. In *N. adala* they are also composed of more distinct patches, and the black submarginal dots on hind wings in *N. adala* are absent.

Proneca, n. g.

Fore wing narrow, elongated, apex rounded, cell extending to half the length of the wing; three subcostals, first emitted near end of cell, second at nearly its length beyond the cell; two radials; lower median emitted at nearly one-fourth before end of cell. Hind wing short, somewhat quadrate in shape; cell fully

half its length; two subcostals from a footstalk beyond end of cell, radial from middle of disco-cellular, two upper medians in a footstalk beyond end of the cell; submedian and internal veins straight. Thorax robust. Abdomen extending beyond hind wings; palpi porrect; first and second joints stout, flattened along their upper edge, and covered with short lax coarse scales, first joint extending half its length beyond the head, second joint as long as the first; third joint slender, squamous, nearly as long as second. Antennæ bipectinated, the branches decreasing in length to two-thirds the tip, the branches finely ciliated. Legs rather long, slender, squamous.

178. *Proneca fola*, n. sp. (Pl. VI., fig. 8).

Palpi and antennæ pale pinkish grey; palpi brown at the sides and base. Thorax pale purplish brown, with a pale pinkish grey broad band in front and at the sides. Fore wing pale pinkish grey, diffused with pale purplish brown on the costal and lower marginal portions; a broad brown band outwardly limited by a blackish line from the centre of the inner margin to the outer margin below the apex, the band getting broader inwardly; an indistinct sinuous brown line between the band and the outer margin. Hind wing and abdomen brownish grey, unmarked. Expanse of wings, $\frac{9}{10}$ in.

Thyetmyo, November, 1887, In coll. Swinhoe.

179. *Limacodes inferma*, n. sp.

♂. Pinkish gray; body and wings covered with brown atoms, making the insect of two or three shades of colour in parts. Antennæ simple. Fore wings with three brown outwardly curved bands, more or less broken, well separated; first before the middle, fairly complete, but not quite touching the costa; second just beyond the middle, and not rising higher than the end of the cell; third sub-submarginal, from hinder angle to costa one-third from apex; a small longitudinal brown streak in the centre near the base. Hind wings unmarked, whitish towards the base; under side paler, costal space on fore wings and central space on hind wings suffused with brown, otherwise unmarked. Expanse of wings, $\frac{8}{10}$ in.

Rangoon, Bhamo; October, 1882. In coll. Swinhoe.

Somewhat resembles *Merisa propexa*, Swinh., but has three curved bands in fore wing instead of two nearly straight ones, and they are also very differently placed.

180. *Setora neutra*, n. sp.

♂. Antennæ pale reddish brown; palpi brown, with pale tips. Head, collar, and fore part of thorax bright golden yellow. Body and fore wings dark bright golden brown. Abdomen with a large yellow spot at the base and a large golden patch before the anal tuft. Fore wings with a black straight ante-medial band inclining outwards, a submarginal bidentate line inwardly broadly margined with gold-colour, a brown mark at the end of the cell, and hinder marginal border brown. Hind wings pale pinkish brown; fringe of both wings pinkish grey; fringe long at hinder angle of fore wings and anal angle of hind wings, and deep black. Under side: Body and legs pinkish brown; wings pale pinkish brown, unmarked. Expanse of wings, 1 in.

Rangoon, May, 1886. In coll. Swinhoe.

Distinguishable from *Setora divergens*, Moore, by its golden front and differently dispersed bands.

181. *Miresa fumifera*, n. sp. (Pl. VI., fig. 13).

♂. Palpi ochreous. Antennæ, body, and wings pale brownish black. Fore wings with a very large deep black spot near the hinder margin in its centre, at the inner upper end of this spot is a suffused pink spot, and a pure white elongated spot with its lower end dividing the upper part of the black and pink spots; under side as above; wings yellowish at the apex and outer borders; legs with ochreous tarsi with thin brown bands. Expanse of wings, $\frac{8}{10}$ in.

Rangoon, 1887. In coll. Swinhoe.

Allied to nothing I know of.

182. *Cania? minutissima*, n. sp. (Pl. VI., fig. 11).

Antennæ of an enormous size, as long as the whole body, heavily pectinated to the tips; pectinations of unusual length, shaft luteous; pectinations dark pinkish grey. Thorax and fore wings luteous, covered with pink atoms; costal line pinkish grey, and a straight upright discal line of a similar colour; ante-medial, from the hinder margin near the angle to the costa, one-third from the apex; a fine marginal line and fringe pinkish. Abdomen and hind wings white, a grey marginal line to the latter and a very long white fringe; under side luteous; middle and hind tibiæ clothed with long hairs, and very long spurs in pairs of equal lengths, one pair

in the middle, and two pairs on the hind tibiæ. Expanse of wings, $\frac{1}{2}$ in.

Rangoon, August, 1888. In coll. Swinhoe.

Allied to nothing I know of, nearest to *Cania;* is very curious little insect belonging to this family.

183. *Chromettia ferruginea.*

Belippa ferruginea, Moore, Ann. Mag. N. H. (4), xx., p. 348 (1877).

Rangoon; Bhamo, October, 1882. In coll. Swinhoe.

LASIOCAMPIDÆ.

184. *Eupterote tavoensis.*

Eupterote tavoensis, Moore, P. Z. S., 1878, p. 848, pl. 53, f. 7.

(Type). Tenasserim. In I. M., Calcutta.

185. *Lenodora semihyalina*, n. sp. (Pl. VI., figs. 10 & 16).

♂. Reddish brown. Wings darker than the body; wings with a semihyaline patch in their centres, caused by the minuteness of the scales in those portions; the patch on the fore wing occupies nearly the whole central portion of the wing, and runs in towards the base and apex and hinder angle, and the patch in the hind wing occupies the upper outer portion of the wing; the wings look just as if they had been pinched with the fingers, but the insect is perfect and in first-rate condition, and all the patches are exactly uniform, and are undoubtedly natural, and are the same above and below; under side slightly paler than the upper side; the insect is otherwise quite unmarked above and below.

♀. Pale pinkish grey. Antennæ brown. Body and wings of the same uniform colour above and below. Wings sparsely clothed all over, and with faint indications of the same hyaline patches of the male. Expanse of wings, ♂ $1\frac{6}{10}$, ♀ $1\frac{9}{10}$ in.

♂, Rangoon, 1886; ♀, Bassein, September, 1888. In coll. Swinhoe.

Much the same shape and colour in both sexes as *L. costalis*, Walker, but is easily distinguishable by the absence of the longitudinal whitish streak in fore wings, and by its semihyaline wing-centres.

186. *Gastropacha modulata*, n. sp. (Pl. VI., fig. 18).

♂. Brownish red, with a pinkish tinge; pectinations of antennæ blackish brown. Fore wings with an indistinct medial thin brown band, which curves round the end of the cell on to the costa, and an indication of another similar ante-medial band; marginal portion of the wing broadly but lightly suffused with brown. Hind wings unmarked; under side suffused with brown; hinder margin of fore wings palest. Expanse of wings, 2 in.

Bhamo, October, 1882. In coll. Swinhoe.

Allied to *G. terrida*, Moore, but differs in colour and in the absence of the whitish spot at the end of the cell, and the bands on the hind wings.

187. *Trabala vishnu.*

Gastropacha vishnu, Lefebvre, Zool. Journ., iii., p. 207 (1827).
Amydona basalis, Walker, vi., p. 1394 (1855).
A. prasina, Walker, vi., p. 1417.

Moulmein. In B. M.
Mandalay. In coll. Swinhoe.

188. *Trabala irrorata.*

Trabala irrorata, Moore, Trans. Ent. Soc. Lond., 1884, p. 375.

(Type). Mergui. Tavoy, December. In I. M., Calcutta.

189. *Estigena nandina.*

Estigena nandina, Moore, Cat. Lep. E. I. C., ii., p. 427 (1859).
Gastropacha abstracta, Walker, xxxii., p. 551 (1865).
Lebeda scriptiphaga, Walker, xxxii., p. 569.

Mergui. In I. M., Calcutta.

SATURNIIDÆ.

190. *Attacus atlas.*

Phalæna atlas, Linn., Mus. Lud. Ulr., p. 366 (1764).

Rangoon. In coll. Swinhoe.

191. *Loepa sikkima.*

Loepa sikkima, Moore, P. Z. S., 1865, p. 818.

Burma. In Phayre Museum, Rangoon.

192. *Cricula burmana*, n. sp.

Marked similarly to *C. trifenestrata*, and of about the same size, but of a dull reddish brown colour. I have a long series of both sexes, and they are all of the same tone of colour, not one of them having the bright yellowish red colour of *C. trifenestrata*. The cocoon also is very different; the cocoon of *C. trifenestrata*, which is well known, is in a network, full of punctures and transparent, so that the chrysalis in the inside is plainly visible, whereas the cocoon of this insect is solid and thick, and is made of most beautiful continuous silk, which looks marketable. I had a large cluster of them sent to me from the Karen Hills by Mr. Ezechiel, and have some of the moths they produced still in my collection.

Rangoon, July, 1888; Karen Hills. In coll. Swinhoe.

I have this insect also from the Naga Hills, and from Assam.

COSSIDÆ.

193. *Zeuzera oblita*, n. sp. (Pl. VI., fig. 9).

♀. White, slightly tinged with pinkish. Thorax with three black spots on each side. Abdomen with three rows of black spots, one down the centre and one down each side. Fore wing with black spots on the costa, outer and hinder margins, and with many spots and short latitudinal streaks on the wing, a cluster of them about the middle of the cell, very few in the space beyond the cell. Hind wings with spots on the outer margin and four or five spots together in the interno-median area. Below same as above; fore and middle legs with black tibiæ and tarsi; hind legs with black tarsi. Expanse of wings, $1\frac{6}{10}$ in.

Rangoon, July, 1885. In coll. Swinhoe.

Allied to *Z. indica*, Boisd.; markings on fore wings somewhat similarly disposed, is very minute in comparison, and the hind wing and thorax are altogether differently marked.

194. *Arbela ? dea*, n. sp. (Pl. VI., fig. 7).

Antennæ pinkish grey. Head white. Body and wings above bright dark olive-brown. Thorax with some white marks. Abdomen whitish at the base. Fore wings with some indistinct black marks on the costa and some in the middle of the wing, and some on its pale pinkish fringe. Hind wings paler at the anal border. Underside: Face and body white; legs white, striped with brown above; wings same as above, slightly paler; costa of fore wings marked with pale pinkish grey; anal tuft same colour as the wings, enormously long and thick, cylindrical, more than two-thirds the length of the abdomen. Expanse of wings, $\frac{9}{10}$ in.

Rangoon, May, 1886. In coll. Swinhoe.

A very curious little insect; allied to nothing I know of. Undoubtedly of the family *Cossidæ*, of an undescribed genus near *Arbela*, which I leave to be described when more specimens are forthcoming.

195. *Phragmatœcia minor.*

Phragmatœcia minor, Moore, Descr. Ind. Lep. Atk., i., p. 87 (1879).

Bhamo. In coll. Swinhoe.

HEPIALIDÆ.

196. *Hepialus tavoyanus.*

Hepialus tavoyanus, Moore, Journ. As. Soc. Beng. (55), 2, i., p. 98 (1886).

Tavoy. In I. M., Calcutta.

Explanation of Plate VI.

Fig. 1. *Melittia notabilis*, n. sp., p. 168.
2. ,, *pellecta*, n. sp., p. 169.
3. ,, *volatilis*, n. sp., p. 170.
4. ,, *congruens*, n. sp., p. 169.
5. *Pramila minuta*, n. sp., p. 171.
6. *Syntomis volans*, n. sp., p. 173.
7. *Arbela dea* ♂, n. sp., p. 199.
8. *Proneca fola*, n. sp., p. 194.
9. *Zeuzera oblita* ♀, n. sp., p. 198.
10. *Lenodora semihyalina* ♂, n. sp., p. 196.
11. *Cania minutissima*, n. sp., p. 195.
12. *Tinolius zingha*, n. sp., p. 185.
13. *Miresa fumifera*, n. sp., p. 195.
14. *Parasa mirza*, n. sp., p. 192.
15. *Hyperæschra annulata*, n. sp., p. 189.
16. *Lenodora semihyalina* ♀, n. sp., p. 196.
17. *Arsiloncha roseana*, n. sp.
18. *Gastropacha modulata*, n. sp., p. 197.

VI. *The moths of Burma.* Part II. By Colonel Charles Swinhoe, F.L.S., F.Z.S., &c.

[Read February 5th, 1890.]

Plates VII. & VIII.

GEOMETRITES.

EROSIIDÆ.

197. *Orudiza protheclaria.*

Orudiza protheclaria, Walker, xxiii., p. 858 (1861).

(Type). Moulmein. In B. M.

198. *Dirades conchiferata.*

Dirades conchiferata, Moore, Lep. Ceylon, iii., p. 403, pl. 186, f. 11 (1887).

Rangoon, August, 1888. In Phayre Museum, Rangoon.

EUSCHEMIDÆ.

199. *Euschema andersoni.*

Euschema andersoni, Moore, Journ. Linn. Soc. Lond., Zool., xxi., p. 56 (1886).

Mergui, March, 1882. In coll. Swinhoe.

200. *Euschema aurilimbata.*

Euschema aurilimbata, Moore, P. Z. S., 1878, p. 846.

Tenasserim, Mithantoung. In I. M., Calcutta.
Mergui. In coll. Swinhoe.
Tavoy. In coll. Moore.

201. *Euschema bellona.*

Euschema bellona, Walker, ii., p. 405 (1854).

(Type). Moulmein. In B. M.
Mergui. In I. M., Calcutta.
Rangoon. In coll. Swinhoe.

202. *Euschema excubitor.*

Euschema excubitor, Moore, P. Z. S., 1878, p. 846.

(Type). Tenasserim. In I. M., Calcutta.
Pegu. In coll. Moore.

203. *Euschema horsfieldi.*

Euschema horsfieldi, Moore, Cat. Lep. E. I. C., ii., p. 334, pl. 8*a*, f. 7 (1859).

Tavoy. In I. M., Calcutta.
Tenasserim. In coll. Moore.

204. *Euschema ludifica*, n. sp.

Thorax and abdomen bright chrome-yellow, unmarked. Antennæ with the shaft greyish yellow, pectinations black. Fore wings bright chrome-yellow for half the length from the base, with some pale blackish blue spots which represent the usual basal bands; remainder of the wing blackish blue, with two pale bluish white macular bands, as in *E. bellona*, but broader. Hind wings yellow for nearly two-thirds of the length from the base, with one large blackish blue spot at the end of the cell and a smaller and indistinct spot alongside, near the abdominal margin; the yellow colour is limited by a blackish blue band with a deep outer curve opposite the large spot, followed by a broken irregular band of yellow, and the outer portion of the wing blackish blue. Under side as above; tarsi of the male yellowish grey; the female has, however, the legs altogether of that colour. Expanse of wings, ♂ ♀ $2\frac{2}{10}$ in.

Rangoon, April and May, 1886. In coll. Swinhoe.

Differs from *E. bellona*, its nearest ally, in its narrower fore wings, in having the thorax and abdomen unmarked, in the pale spotted nature of the basal bands in the fore wing, and the greater extent of yellow in both wings. I have three males and one female before me, which are all exactly alike.

205. *Euschema lunulata.*

Euschema lunulata, Butler, Ann. Mag. N. H. (5), xx., p. 375 (1882).

Tavoy. In I. M., Calcutta.
Tenasserim. In coll. Moore.

206. *Euschema militaris.*

Phalæna militaris, Linn., Mus. Lud. Ulr., p. 375 (1764).

Tavoy. In I. M., Calcutta.
Bassein, October, 1887. In coll. Swinhoe.

207. *Euschema sodalis.*

Euschema sodalis, Moore, Journ. As. Soc. Beng. (55), 2, i., p. 99 (1886).

Tavoy. In coll. Swinhoe.

208. *Euschema subrepleta.*

Euschema subrepleta, Walker, ii., p. 406 (1854).

Mergui. In I. M., Calcutta.

209. *Milionia pyrozonis.*

Milionia pyrozonis, Butler, Ann. Mag. N. H. (5), x., p. 375 (1882).

Upper Tenasserim, August. In coll. Swinhoe.

210. *Celerena andamana.*

Celerena andamana, Felder & R., Reise Nov. Lep., iv., pl. 130, f. 18 (1874).

Upper Tenasserim, August. In coll. Swinhoe.

URAPTERYDÆ.

211. *Urapteryx podaliriata.*

Urapteryx podaliriata, Guén., Phal., i., p. 32 (1857).

Moulmein. In B. M.
Tenasserim. In I. M., Calcutta.

212. *Thinopteryx crocopterata.*

Urapteryx crocopterata, Kollar, Hüg. Kasch., iv., p. 483 (1848).

Tavoy. In I. M., Calcutta.

213. *Chærodes? umbrosa*, n. sp. (Pl. VII., fig. 4).

♂. Fore wing long; costa rounded towards the apex, which is nearly falcate; outer margin very oblique, sinuous; hinder margin

straight. Hind wing angled in the centre, greyish rosy, suffused with brownish shades; palpi, antennæ, and hind part of thorax dark brown, front of thorax with a yellow tinge; wings and abdomen irrorated sparsely with dark blackish brown atoms; fore wing with a brownish patch at the base, a blackish brown spot at upper end of cell, and four patches at regular intervals in the costa, from the last of which, at one-third from the apex, is a transverse slightly sinuous line to the hinder margin one-third from the angle, this line being connected with the apex by a streak near its upper end, and there is a brown patch at the other end on the hinder margin; a few fainter brownish marks on the costa at the apex, and a submarginal sinuous faint line containing brown spots, more or less marked with white in the interspaces; the costa at the apex is slightly luteous, and there is a small slightly luteous patch just below the streak touching the apical point. Hind wing more or less sparsely covered with blackish brown atoms, rather thickly so on the abdominal margin, where there is a large patch at one-third from the anal angle; a submarginal line similar to the one on the fore wing. Expanse of wings, $1\frac{6}{10}$ in.

Rangoon, September, 1888. In coll. Swinhoe.

Not allied to anything I know of; is nearest the genus *Cherodes*.

214. *Euchera pitmani*.

Euchera pitmani, Moore, Journ. As. Soc. Beng. (55), 1, ii., p. 99 (1886).

Tavoy. In coll. Swinhoe. (Type). Tavoy. In coll. Moore.

215. *Kalabana picaria*.

Lagyra picaria, Walker, xxxv., p. 1541 (1866).

Mergui. In I. M., Calcutta.

ENNOMIDÆ.

216. *Hyperythra angulifascia*.

Hyperythra angulifascia, Moore, P. Z. S., 1878, p. 851, pl. 53, f. 11.

(Type). Tenasserim. In I. M., Calcutta.

217. *Hyperythra lutea*.

Phalæna (*Geometra*) *lutea*, Cram., Pap. Exot., iv., pl. 370, figs. c, d (1781).

P. flavata, Fabr., Ent. Syst., iii., 2, p. 169 (1794).
Hyperythra limbolaria, Guén., Phal., i., 101, 153, pl. 3, figs. 3, 4, ♀ (1857).
H. penicillaria, Guén., Phal., i., 101, 154.

Moulmein. In B. M.
Rangoon, September and October, 1888. In coll. Swinhoe.

218. *Hyperythra lala*, n. sp.

♂ ♀. Bright luteous. Antennæ brownish, top of head and collar ochreous. Wings sparsely covered with transverse brown striations, crossed by central and discal reddish brown thin bands, the outer band accompanied on its outer side by a broad reddish brown shade, with a large blackish brown subcostal spot on the hind wings; there is also, on the fore wings, a more indistinct inner band, these bands are very variable, and generally more complete in the female than in the male; the colour of the female is also sometimes greyer than of the male. Below the yellow colour is brighter than above, and the bands redder, and there is sometimes a whitish apical patch in fore wings. Expanse of wings, $1\frac{4}{10}$—$1\frac{5}{10}$ in.

Rangoon, October, 1888. In coll. Swinhoe.

I have this insect also from Bombay, Ganjam, and Dhera Dun. It is nearest to *H. swinhoei*, Butler, but can at once be distinguished by its entirely different colour.

219. *Angerona figlina*, n. sp. (Pl. VII., fig. 5).

♂. Palpi and face blackish brown. Antennæ with the shaft chocolate-brown, setæ pale yellow, a whitish space on the top of the head. Body and wings of a uniform rather pale chocolate-brown, tinged with pinkish. Abdomen with a white basal spot, anal tuft pinkish white; both wings crossed by an irregularly dentated pale line, just beyond the middle, from the abdominal margin of the hind wings, two-fifths from the angle to the costa of the fore wings, two-fifths from the apex, curved outwardly on the hind wings, almost straight on the fore wings, and with all the dentations outwards; also a very indistinct pale submarginal line of a similar nature, marginal line brown; fringe pale at the base. Under side pinkish grey, suffused in places with brownish; the first line very distinct, and beyond this the wings are darker coloured. Expanse of wings, $1\frac{3}{10}$ in.

Karen Hills, April, 1887. In coll. Swinhoe.

Differs from all other known species of this genus in its small size and peculiar brown coloration.

OXYDIDÆ.

220. *Omiza schistacea.*

Omiza schistacea, Moore, P. Z. S., 1878, p. 851, pl. 53, f. 12.

(Type). Tenasserim. In I. M., Calcutta.

ÆNOCHROMIDÆ.

221. *Noreia ajaia.*

Timandra ajaia, Walker, Journ. Linn. Soc. Lond., Zool., iii., p. 195 (1859).
Noreia perdensata, Walker, xxiv., p. 1092 (1862).
Decetia posticata, Walker, xxxv., p. 1557 (1866).

Rangoon, August, 1888. In coll. Swinhoe.

222. *Chilkasa falcata.*

Chilkasa falcata, Swinhoe, P. Z. S., 1885, p. 853.

Rangoon, July, 1888. In coll. Swinhoe.

BOARMIDÆ.

223. *Medasina strixaria.*

Hemerophila strixaria, Guén., Phal., i., 217, 312 (1857).

Moulmein. In B. M.

224. *Chogada processaria.*

Boarmia processaria, Walker, xxi., p. 372 (1860).

(Type). Moulmein. In B. M.

225. *Catoria trispinaria.*

Boarmia trispinaria, Walker, xxi., p. 378 (1860).

Mergui. In I. M., Calcutta.

226. *Catoria procursaria.*

Boarmia procursaria, Walker, xxi., p. 375 (1860).

(Type). Moulmein. In B. M.

227. *Catoria sublavaria.*

Boarmia sublavaria, Guén., Phal., i., 256, 393 (1857).

Moulmein. In B. M.
Rangoon, July, 1888. In coll. Swinhoe.

228. *Hirasa scripturaria.*

Tephrosia scripturaria, Walker, xxxv., 1590 (1866).

Mergui. In I. M., Calcutta.

229. *Serraca transcissa.*

Boarmia transcissa, Walker, xxi., p. 380 (1860).

Rangoon, June. In coll. Swinhoe.

230. *Amraca fortissima.*

Amraca fortissima, Moore, Descr. Ind. Lep. Atk., iii., p. 245 (1887).

Bassein, August, 1888. In coll. Swinhoe.

231. *Pingasa crenaria.*

Hypochroma crenaria, Guén., Phal., i., 278, 441 (1857).

Thyetmyo, July, 1888. In Phayre Museum, Rangoon.

232. *Pingasa minimaria.*

Hypochroma minimaria, Guén., Phal., i., 279, 443 (1857).
H. parvula, Walker, xxi., p. 435 (1860).

(Type *parvula*). Moulmein. In B. M.

233. *Elphos hymenaria.*

Elphos hymenaria, Guén., Phal., i., 285, 456, pl. 16, f. 4 (1857).

Pegu. In coll. Swinhoe.

234. *Petelia medardaria.*

Petelia medardaria, Herr.-Schäff., Exot. Schm., pl. 94, f. 534 (1850—69).
Bargosa chacoraca, Walker, xxi., p. 481 (1860).

B. chandubija, Walker, xxi., p. 480.
B. distracta, Walker, xxi., p. 481.
Ephyra? strigulataria, Walker, xxvi., p. 1575 (1862).

Thyetmyo, November, 1887. In Phayre Museum, Rangoon.
Rangoon, September and October, 1888. In coll. Swinhoe.

GEOMETRIDÆ.

235. *Geometra discissa.*

Geometra discissa, Walker, xxii., p. 517 (1861).

(Type). Moulmein. In B. M.

236. *Maxates cœlataria.*

Thalassodes cœlataria, Walker, xxii., p. 552 (1861).

Rangoon, August and September, 1888. In coll. Swinhoe.

237. *Thalassodes dissimulata.*

Thalassodes dissimulata, Walker, xxii., p. 551 (1861).

(Type). Moulmein. In B. M.

238. *Thalassodes palliplagiata.*

Thalassodes palliplagiata, Walker, xxvi., p. 1563 (1862).

(Type). Moulmein. In B. M.

239. *Thalassodes sisunaga.*

Thalassodes sisunaga, Walker, xxii., p. 550 (1861).
T. macruraria, Walker, xxvi., p. 1561 (1863).

(Type of *sisunaga*). Moulmein. In B. M.

240. *Thalera dirempta.*

Thalera dirempta, Walker, xxii., p. 595 (1861).

(Type). Moulmein. In B. M.

241. *Comibœna pannosa.*

Comibœna pannosa, Moore, Lep. Ceylon, iii., p. 433, pl. 195, figs. 1, 1*a*, *b*, ♂ ♀ (1887).
C. devexata var., Walker, xxii., p. 574 (1861).

(Type, *devexata*, var.). Moulmein. In B. M.

242. *Agathia lycœnaria.*

Geometra lycœnaria, Kollar, Hüg. Kasch., iv., p. 486 (1848).
G. albiangularia, Herr.-Schäff., Exot. Schm., pl. 61, f. 339 (1850—69).
Agathia discriminata, Walker, xxii., p. 591 ♀ (1861).
Moulmein. In B. M.

PALYADÆ.

243. *Eumelia aureliata.*

Eumelia aureliata, Guén., Phal., i., 394, 631, pl. 22, f. 6 (1857).
Thyetmyo, June, 1881. In Phayre Museum, Rangoon.

244. *Eumelia fimbriata.*

Phalæna (*Geometra*) *fimbriata*, Cram., Pap. Exot., iv., p. 398, f. N (1782).
Eumelia eugeniata, Guén., Phal., i., 394, 633 (1857).
Moulmein. In B. M.

245. *Eumelia rosalia.*

Phalæna (*Geometra*) *rosalia*, Cram., Pap. Exot., iv., pl. 368, f. F (1782).
Ametris punicearia, Hübn., Verz. Schm., 303, 2924 (1816).
Tavoy. In I. M., Calcutta.
Moulmein. In B. M.

246. *Cacyparis læta.*

Ballatha læta, Walker, xxxiv., p. 1215 (1865).
Moulmein. In B. M.

EPHYRIDÆ.

247. *Anisodes similaria.*

Anisodes similaria, Walker, xxvi., p. 1582 (1861).
(Type). Moulmein. In B. M.

248. *Anisodes rapistriaria*, n. sp. (Pl. VII., fig. 9).

Pale reddish ochreous, marks and bands ochreous-brown; a fine line across the top of the head, two bands across the thorax; both wings crossed by many sinuous lines, some of which, running close together, form bands, notably one across the centre of the fore wings, and continued on the hind wing across the basal third, one submarginal on fore wing, and discal and submarginal on hind wing; marginal points black; cilia yellow. Expanse of wings, $\frac{9}{10}$ in.

Rangoon, October, 1888. In coll. Swinhoe.

A pretty little *Anisodes* of an entirely new pattern.

MACARIDÆ.

249. *Macaria emersaria.*

Macaria emersaria, Walker, xxiii., p. 925 (1861).

(Type). Moulmein. In B. M.

250. *Gubaria fasciata.*

Phalæna fasciata, Fabr., Syst. Ent., 629 (1775).

P. eleonora, Cram., Pap. Exot., iii., pl. 288, figs. E, F, G (1782).

Moulmein. In B. M.

Rangoon. In Phayre Museum, Rangoon.

251. *Gubaria xanthonora.*

Macaria xanthonora, Walker, xxiii., p. 935 (1861).

Pyentaza, April, 1888. In Phayre Museum, Rangoon.

252. *Gonodela inchoata.*

Macaria inchoata, Walker, xxiii., p. 931 (1861).

(Type). Moulmein. In B. M.

253. *Gonodela vasudeva.*

Macaria vasudeva, Walker, xxiii., p. 933 (1861).

Gonodela placida, Moore, Descr. Ind. Lep. Atk., iii., p. 262 (1887).

Rangoon, November, 1888. In coll. Swinhoe.

254. *Azata ferruginata.*

Azata ferruginata, Moore, Lep. Ceylon, iii., p. 470, pl. 205, f. 2 (1887).

Rangoon, October, 1888. In coll. Swinhoe.

FIDONIDÆ.

255. *Corymica arnearia.*

Corymica arnearia, Walker, xx., p. 231, ♀ (1860).
Caprilia vesicularia, Walker, xxxv., p. 1659, ♂ (1866).

Rangoon, October, 1888. In coll. Swinhoe.

256. *Prionia squalidaria.*

Prionia squalidaria, Hübn., Zuträge, iv., 40, figs. 787—8, ♀ (1832).
P. violacearia, Guén., Phal., i., 144, 231 (1857).
Osicerda alienata, Walker, xxiv., p. 1084 (1862).
Celesdera schistifusata, Walker, xxvi., p. 1749 (1862).

Rangoon, July, 1888. In Phayre Museum, Rangoon.

257. *Panagra idea*, n. sp. (Pl. VII., fig. 2).

♂. Greyish purple, irrorated with brown atoms; wings, with the costa, pale grey; a brown band from apex of fore wings to abdominal margin of hind wings, one-third from base, another similar parallel band on the hind wings beyond the middle, and a third band on hind wings between this and the outer margin, which becomes slightly bent and sinuous towards the acute hinder angle; inside all these bands the wings are suffused with pale grey; marginal line black; cilia white. Expanse of wings, $1\frac{7}{10}$ in.

Bassein, October, 1887. In coll. Swinhoe.

Distinguishable from the Australian *A. hypenaria*, Guén., in having the transverse oblique bands on the hind wings.

ZERENIDÆ.

258. *Abraxas perampla*, n. sp.

♂. Antennæ grey; palpi ochreous. Body and wings white, spotted and marked with pale blackish brown. Head, thorax, and costal portion of fore wings slightly tinged with yellowish; head, collar, and thorax with some spots. Abdomen unmarked. Fore wings with a number of spots on the costal and basal portions, and one large spot at the end of the cell. Hind wing with a similar

but smaller spot, and both wings with four lines of spots; first ante-medial represented on fore wing by a streak from hinder margin, and on hind wing by a broken disjointed band, second post-medial being a discal straight band from upper radial interspace inclining to a little beyond centre of first median branch, then a small dot, then a large spot on hinder margin forming a broken elbow, and on the hind wing an outwardly curved band broken in its centre; third, a row of large spots, one on each vein on both wings, except the lower radial of the fore wing and radial vein of hind wing; fourth, a row of marginal spots, a little smaller in each interspace on both wings. Expanse of wings, $3\frac{2}{10}$ in.

Upper Tenasserim, August, 1880. In coll. Swinhoe.

An unusually large and peculiarly marked species of this genus.

259. *Abraxas triseriata.*

Abraxas triseriata, Walker, xxiv., p. 1125 (1862).

Mergui. In coll. Swinhoe.

260. *Abraxas virginalis.*

Abraxas virginalis, Butler, P. Z. S., 1886, p. 392, pl. 35, f. 11.

Pegu. In coll. Swinhoe.

261. *Potera marginata.*

Potera marginata, Moore, P. Z. S., 1878, p. 852, pl. 53, f. 9.

(Type). Tenasserim. In I. M., Calcutta.

LARENTIDÆ.

262. *Photoscotosia amplicata.*

Cidaria amplicata, Walker, xxv., p. 1404 (1862).

Pegu. In coll. Swinhoe.

IDŒIDÆ.

263. *Idœa attentata.*

Acidalia attentata, Walker, xxii., p. 754 (1861).

(Type). Moulmein. In B. M.
Tenasserim. In I. M., Calcutta.

264. *Idœa emissaria.*

Acidalia emissaria, Walker, xxii., p. 751 (1861).

(Type). Moulmein. In B. M.

265. *Idœa ligataria.*

Acidalia ligataria, Walker, xxii., p. 748 (1861).

(Type). Moulmein. In B. M.
Rangoon, September, 1888. In Phayre Museum, Rangoon.

266. *Idœa regulata.*

Acidalia regulata, Walker, xxiii., p. 794 (1861).

(Type). Moulmein. In B. M.

267. *Craspedia addictaria.*

Acidalia addictaria, Walker, xxii., p. 749 (1861).

Thyetmyo, October, 1887. In Phayre Museum, Rangoon.

268. *Rambara saponaria.*

Zanclopteryx saponaria, Guén., Phal., ii., 16, 915 (1857).

Moulmein. In B. M.
Mergui. In I. M., Calcutta.
Rangoon, August, 1888. In coll. Swinhoe.
Tounghu. In coll. Moore.

269. *Pseudasthena memorata.*

Pomasia memorata, Walker, xxii., p. 657 (1861).

(Type). Moulmein. In B. M.

270. *Asthena tristicula.*

Asthena tristicula, Swinhoe, P. Z. S., 1885, p. 859, pl. 56, f. 17.

Rangoon, August, 1888. In coll. Swinhoe.

271. *Asthena urbica.*

Asthena urbica, Swinhoe, P. Z. S., 1885, p. 859.

Moulmein, June, 1888. In Phayre Museum, Rangoon.

272. *Timandra aventiaria.*

Timandra aventiaria, Guén., Phal., ii., 3, 896 (1857).

Moulmein. In B. M.

273. *Timandra comptaria.*

Timandra comptaria, Walker, xxvi., p. 1615 (1862).

Rangoon, August and September, 1888. In coll. Swinhoe.

274. *Timandra burmana*, n. sp.

Upper side green, irrorated with greyish atoms. Wings with a straight yellowish white line from the centre of the abdominal margin of the hind wings to the costa of the fore wings, one-sixth from the apex; marginal line whitish yellow; fringe greenish grey. Under side pale greenish yellow, nearly white; both wings crossed by a row of pinkish brown submarginal dots from the costa near the apex to the abdominal margin of the hind wings near the angle, nearly straight on both wings, and accompanied on the outer side by a number of bright pink longitudinal short streaks, which gives it the appearance of a broadish pink band; fringe on both wings pink. Expanse of wings, $1\frac{2}{10}$ in.

Rangoon, June, 1888. In coll. Swinhoe.

Looks on the upper side somewhat like a gigantic *Timandra mundissima*, Walker = *T. diatomata*, Walker, but differs in the colour of the marginal band above, and the pink band below; *T. mundissima*, a very common Indian insect, of which I have many examples, being always quite immaculate below.

275. *Lycauges annularia*, n. sp. (Pl. VII., fig. 18).

Pale pinkish grey, sparsely irrorated with deep black atoms; collar black. Thorax with two large black spots behind. Abdomen with black spots down the centre. Fore wings with the costal portion grey; a grey band across both wings from apex of fore wings to abdominal margin of hind wings above the centre; fore wing with a black spot at upper end of cell, one on hinder margin near the base, and another between them in a line; a spot in a straight line between the cell-spot and the margin, a submarginal and marginal curved row of spots, the third from the costa of the submarginal row the largest, and two sinuous indistinct grey lines in the marginal space. Hind wing with a black ringlet at the end

of the cell, three indistinct sinuous grey lines in the marginal space, and a marginal row of black lunules, one of them at the extreme end of the angle in the centre. Expanse of wings, $\frac{9}{10}$ in.

Rangoon, 1883. In coll. Swinhoe.

Allied to *L. postvittata*, Moore; differs in the absence of the longitudinal bands on the wings, and in having a prominent ringlet in the centre of the hind wings.

276. *Luxiaria exclusa.*

Hemerophila? exclusa, Walker, xxi., p. 320, ♂ (1860).
H. prætereuns, Walker, xxi., p. 320.
Acidalia imprimata, Walker, xxiii., p. 771 (1861).
Macaria obstataria, Walker, xxiii., p. 928.
Bithia lignaria, Walker, xxxv., p. 1600 (1866).

(Type of *exclusa*). Moulmein. In B. M.
Rangoon. In coll. Swinhoe.

MICRONIDÆ.

277. *Micronia aculeata.*

Micronia aculeata, Guén., Phal., ii., 26, 928, pl. 13, f. 8, ♀ (1857).
M. gannata, Guén., *l. c.*, No. 929, ♂.

Moulmein. In B. M.
Mandalay. In coll. Swinhoe.
Mergui. In I. M., Calcutta.
Tavoy. In coll. Moore.

278. *Micronia sparsaria.* (Pl. VII., fig. 3).

Micronia sparsaria, Walker, xxiii., p. 818 (1861).

Bassein, October, 1887; Rangoon, August, 1886. In coll. Swinhoe.

Walker's type-label in the B. M. has somehow got upon a wrong specimen; his type-label is now upon a specimen of the subgenus *Acropteris*, which consequently has to this day remained undescribed. In his description he says "this species is distinguished from the preceding one by the indefinite outline of the bands, and by the much more distinct angle of the hind wings"; and this description exactly corresponds with the large *Micronia* I identify as *sparsaria*, common in the north and north-

eastern portions of India, and which, though a good and constant species, much resembles *aculeata* (his preceding species) in shape and markings. Mr. Butler suggests that Walker's description-slips might have got transposed, and by the preceding species he may have meant some species other than *aculeata;* but his type-label is on an *Acropteris*, and the only species of that genus described by Walker is *A. convexaria*, the hind wings of which are perfectly rounded, without any inclination to an angle; and therefore his remark about the much more distinct angle of the hind wings cannot apply.

279. *Acropteris obliquaria.*

Micronia obliquaria, Moore, P. Z. S., 1877, p. 622, pl. 60, f. 17.

Rangoon, October, 1888. In coll. Swinhoe.

280. *Acropteris cascata.*

Micronia caseata, Guén., Phal., ii., 27, 932 (1857).

Mergui, Tavoy. In I. M., Calcutta.

281. *Acropteris striataria.*

Phalæna (*Geometra*) *striataria*, Clerck, Icon., pl. 55, f. 4 (1759).

Tenasserim. In I. M., Calcutta.
Tavoy. In coll. Moore.

282. *Acropteris vagata.*

Micronia vagata, Moore, P. Z. S., 1877, p. 622, pl. 60, f. 18.

Tavoy. In I. M., Calcutta.
Rangoon, August and September, 1888. In coll. Swinhoe.

283. *Strophidia fasciata.*

Phalæna (*Geometra*) *fasciata*, Cram., Pap. Exot., ii., pl. 104, f. D (1779).
P. caudata, Fabr., Ent. Syst., iii., 2, 163, 124 (1794).
Micronia obtusata, Guén., Phal., ii., 25, 927, pl. 5, f. 6 (1857).

Tavoy. In I. M., Calcutta.
Rangoon, July, 1888. In Phayre Museum, Rangoon.

NOCTUES.

CYMATOPHORIDÆ.

284. *Risoba diversipennis.*

Heliothis diversipennis, Walker, xv., p. 1750 (1858).

(Type). Moulmein. In B. M.

285. *Risoba obstructa.*

Bolina obstructa, Walker MS.

Risoba obstructa, Moore, P. Z. S., 1881, p. 328.

Rangoon, July, 1888. In coll. Swinhoe.

LEUCANIIDÆ.

286. *Leucania loreyi.*

Leucania loreyi, Dup., Hist. Nat. Lep. France, iv., p. 81, pl. 105, f. 7 (1827).

L. collecta, Walker, ix., p. 105 (1856).

Upper Burma. In B. M.

287. *Leucania exempta.*

Leucania exempta, Walker, xi., p. 710 (1857).

Rangoon, October, 1888. In coll. Swinhoe.

288. *Leucania hamifera.*

Leucania hamifera, Walker, Journ. Linn. Soc. Lond., vi., p. 179 (1862).

Thyetmyo, June, 1888. In coll. Swinhoe.

289. *Leucania lanceata.*

Leucania lanceata, Moore, P. Z. S., 1881, p. 340.

Bhamo, October, 1882. In coll. Swinhoe.

290. *Leucania sejuncta.*

Leucania sejuncta, Walker, ix., p. 109 (1856).

(Type). Moulmein. In B. M.

291. *Leucania albivenata*, n. sp. (Pl. VII., fig. 7).

Palpi brown. Antennæ, body, and fore wings fawn-colour, tips of the palpi and top of head paler; hind part of head brown;

three very fine brown lines across the fore part of thorax. Abdomen paler. Fore wings with the costa brown up to one-third from the apex; all the costal portion above the subcostal vein and the outer portions of the wing streaked longitudinally with brown and grey; the subcostal branches, outside portion of median vein, and both its branches prominently whitish, a whitish spot at the root where these latter branches are emitted, the whole space between the subcostal vein and the submedian vein dark brown, paling a little towards the outer margin, a yellowish streak above the outer portion of the median vein within the cell; a pale apical shade from the apex, sloping inwards to the submedian branches, and a brown streak near the hinder margin; marginal points black; fringe interlined; hind wings greyish fawn-colour, paler towards the base; veins prominent, marginal points black; fringe pale yellowish grey, a pale brown thick lunule at the end of the cell. Under side pale pinkish fawn-colour; fore wing suffused with brown inwardly, a prominent brown spot on the costa one-third from apex; hind wing with the lunule at end of cell dark brown, some brown marks towards the costa, and a prominent marginal row of brown dots on both wings. Expanse of wings, $1\frac{3}{10}$ in.

Bhamo, October, 1882. In coll. Swinhoe.

Allied to *L. rufistrigosa*, Moore; differs in the absence of the discal curved row of black points on fore wing, in its dark brown markings, and absence of prominent white cell-streak.

292. *Leucania subnitens*. n. sp. (Pl. VII., fig. 1).

Antennæ, palpi above, head, thorax, and fore wings, pale pinkish fawn-colour. Antennæ whitish towards the tips. Fore wings with a broad white costal band, irrorated with greyish atoms; under this band is a brown shade, darkest towards the base, is limited hindwards by the submedian vein, and gradually becomes paler as it extends to the outer margin, and is interrupted by a paler shade, which crosses it from the apex to the interno-median area; the outer portion of the wing is covered with longitudinal brown and grey streaks between the veins, and the entire surface is covered sparsely with black atoms; fringe interlined with pale greyish brown. Hind wings pure white, suffused broadly at its outer portions with greyish brown, and with the veins on this portion darker brown. Abdomen paler than the thorax, with the basal portion white. Wings below of a beautiful uniform burnished silvery white, which in some lights reflects pale glistening golden tints. Expanse of wings, $1\frac{6}{10}$ in.

Bhamo, October, 1882. In coll. Swinhoe.

Somewhat resembles *L. venalba*, Moore, above, but can easily be identified by its pale costa to fore wings, and by the beautiful glistening colour of the wings below.

293. *Leucania nefasta*, n. sp.

Antennæ, palpi, head, thorax, and fore wings pale fawn-colour, tinged with pale pinkish. Fore wings with brown-grey longitudinal streaks between the veins, especially on the costal and outer portions, a thicker streak on the upper side of median and submedian veins, the median vein streak somewhat thickening at the end of the cell, and from the end a short blackish brown patch, interrupted by the grey streaks; an outwardly curved row of black points from the hinder margin, one-third from the angle, to the costa, one-third from the apex, a marginal row of black points; fringe interlined pale brown and pale pinkish fawn-colour. Hind wings white, shining; outer margins shaded with pale fawn-colour. Abdomen grey. Under side paler and duller; fore wings shaded in the upper central portions with brown. Expanse of wings, 1 in.

Bhamo, October, 1882; Rangoon, 1887. In coll. Swinhoe.

Allied to *L. subsignata*, Walker, from which it can easily be distinguished by its whiter hind wings, and the absence of the row of curved discal spots thereon, and also by the absence of the dot at the end of the cell.

294. *Leucania homopterana*, n. sp. (Pl. VII., fig. 12).

Antennæ brown; palpi, thorax, and fore wings fawn-colour; tips of palpi white; fore part of thorax brownish. Abdomen with a brown suffusion down the centre; base, anal end, and sides whitish. Fore wings with the entire surface covered with numerous longitudinal brown and greyish white streaks between the veins, much like the neuration of a homopterous insect; a white streak on outer half of cell above the median vein, a black dot below it; black dots on the costa at regular intervals, a discal outwardly curved row of black dots, and a marginal row of black points; fringe interlined. Hind wings white, marginally suffused with brown; veins near the margin brown, and brown marginal points. Under side whitish; fore wings internally suffused with brown; a brown spot on the costa one-third from the apex; hind wing with brown suffusions on the costal portion; marginal brown points on both wings. Expanse of wings, $1\frac{1}{10}$ in.

Rangoon, June, 1888. In coll. Swinhoe.

Allied to *L. rufistrigosa*, Moore, but differently coloured, and can at once be distinguished by the unusually numerous brown and grey streaks on the whole surface of the fore wings.

295. *Leucania basilinea*, n. sp. (Pl. VII., fig. 6).

Antennæ, palpi, head, thorax, and fore wings pale fawn-colour. Fore wings covered sparsely with brown atoms; a dark black longitudinal prominent streak below the median vein from close to the base to one-third from end of the cell; median vein whitish, with a very slight thickening at end of cell; a discal outwardly curved row of black points, and a marginal row of black points; some indistinct grey and brown streaks between the veins on the outer portion of the wing; fringe interlined. Hind wings pure white, with a marginal row of brown points. Expanse of wings, $1\frac{3}{10}$ in.

Bhamo, October, 1882. In coll. Swinhoe.

Allied to *L. percisa*, Moore, but is easily distinguishable by the prominent basal black streak in the fore wings, by the absence of the black dot at the end of the cell, and by its pure white hind wings.

296. *Sesamia inferens*.

Leucania inferens, Walker, ix., p. 105 (1856).

Bassein, August, 1888; Rangoon, July, 1887. In coll. Swinhoe.

297. *Sesamia proscripta*.

Leucania proscripta, Walker, ix., p. 106 (1856).

Moulmein. In B. M.

298. *Arsiloncha roseana*, n. sp. (Pl. VI., fig. 17).

Antennæ, palpi, head, thorax, and fore wings rosy fawn-colour. Abdomen whitish. Fore wings sparsely covered with brown atoms; some pale spaces between the veins in the central outer portion of the wing, making that portion the palest; marginal line white; fringe white, base pale pink. Hind wings pure white, unmarked. Under side of a pure pale pinkish; fore wings with a grey suffusion on basal half of the centre, costa, and hinder margin; hind wings white. Expanse of wings, $1\frac{4}{10}$ in.

Bhamo, October, 1888. In coll. Swinhoe.

Allied to *S. fraterna*, Moore; can be easily distinguished by the absence of the brown dot in the centre of the fore wing below the median vein, and by the brown irroration of that wing.

299. *Aletia? erigida*, n. sp.

Palpi brown; ends of second joint grey. Antennæ, head, body, and fore wings greyish fawn-colour. Fore wings irrorated with minute black atoms; ante-medial, medial, post-medial, and discal sinuous, fine brown erect lines across the wing; the first has a black spot within the cell on its outer side, the second and fourth have each a pale brown patch in their centres, the third has a row of black spots adjoining on its outer side, the fourth is more sinuous than the rest, and is almost submarginal; orbicular and reniform indicated by pale minute spots; a marginal row of black points; marginal line black, very indistinct; the outer third of the wing, under a glass, is found to be finely crossed by numerous straight brown lines very close together; fringe interlined, and with a pale pinkish basal line; a brown spot on the costa one-third from apex; three subapical costal pale points and all the veins more or less brown. Hind wings greyish white; veins and marginal line pale greyish brown; fringe white, interlined at the base with brown and pale pinkish. Expanse of wings, $1\frac{6}{10}$ in.

Thyetmyo, September, 1887. In coll. Swinhoe.

Not allied to anything I can find; is nearest to the genus *Aletia*.

300. *Axylia abstracta*, n. sp. (Pl. VII., fig. 13).

Antennæ, palpi, fore part of thorax, and fore wings fawn-colour; top of head, remainder of thorax and abdomen greyish. Fore wing with the costa, hinder margin, a central stripe from base, and outer marginal portions of the wing suffused with brown, some of the veins within these parts dark brown, a whitish mark at the end of the cell, and three pairs of whitish longitudinal streaks in eschelon towards the apex. Hind wings white, with the marginal border slightly suffused with pale brown; pale marginal line to both wings and interlined fringe. Under side whitish; fore wings slightly suffused with pale brown along its centre. Expanse of wings, $1\frac{2}{10}$ in.

Bhamo, October, 1882. In coll. Swinhoe.

Allied to *A. fasciata*, Moore, from which it is widely

separated by the absence of the pale central border, its difference in colour, and by the pale apical streaks.

301. *Nonagria ? irregularis.*

Nonagria ? irregularis, Walker, xi., p. 712 (1857).

(Type). Moulmein. In B. M.

HELIOTHIDÆ.

302. *Pradatta bivittata.*

Leucania bivittata, Walker, ix., p. 108 (1856).

(Type). Moulmein. In B. M.

BOMBYCOIDÆ.

303. *Pharetra consanguis.*

Acronycta consanguis, Butler, Ann. Mag. N. H. (5), iv., p. 358 (1879).

Rangoon, July, 1888. In Phayre Museum, Rangoon.

304. *Hyboma divisa.*

Hyboma divisa, Moore, P. Z. S., 1888, p. 409.

Rangoon, June, 1888. In Phayre Museum, Rangoon.

GLOTTULIDÆ.

305. *Glottula dominica.*

Phalæna (*Noctua*) *dominica*, Cram., Pap. Exot., iv., pl. 399, f. H (1782).

Hadena pancratii, Boisd , Faun. Ent. Mad. Romb. et Maur. Lep., 91, 1.

Moulmein. In B. M.

Rangoon, September and October, 1887. In coll. Swinhoe.

306. *Polytela chrysopila.*

Polytela chrysopila, Walker, xxxii., p. 635 (1865).

Karen Hills, April, 1887. In coll. Swinhoe.

BRYOPHILIDÆ.

307. *Bryophila conjecturalis*, n. sp. (Pl. VII., fig. 10).

Antennæ grey; palpi yellowish white, with brown patches on its sides. Head, thorax, abdomen, and fore wings white, marked with

greyish brown; abdomen with greyish brown marks on the segments on each side; fore wings with greyish brown and blackish brown marks on the costa, from which extend two or three indistinct fine sinuous lines across the basal portion of the wing; a black central band, broad on the costa, suffused on its outer side not reaching the hinder margin, before which it becomes indistinct, limited on its inner side by a fine outwardly curved black line; two or three indistinct sinuous discal lines, black dots on the margin between the veins, and a black longitudinal curved and broken streak, which commences at the base, stops at one-third, and is continued from the central line, and continues irregularly towards the outer margin, where its termination is indicated by a small patch, and there is a similar patch in the centre of the outer margin. Hind wings greyish brown, paling towards the base. Expanse of wings, $1\frac{4}{10}$ in.

Rangoon, July, 1888. In coll. Swinhoe.

Allied to *B. nilgiria*, Moore, but differs in its markings, more especially in having the central transverse black band on the fore wings.

ACONTIIDÆ.

308. *Acontia flava.*

Noctua flava, Fabr., Ent. Syst., iii., 2, 51, 139 (1794).
Xanthodes transversa, Guén., Noct., ii., 211, pl. 10, f. 5 (1852).

Moulmein. In B. M.

309. *Acontia intersepta.*

Xanthodes intersepta, Guén., Noct., ii., 212, 979 (1852).

Moulmein. In B. M.
Rangoon, August, 1888. In coll. Swinhoe.

310. *Naranga ferruginea.*

Naranga ferruginea, Moore, Descr. Ind. Lep. Atk., ii., p. 134, ♂ (1882).
N. quadrivittata, Moore, *l. c.*, ♀.

Rangoon, August, 1888. In coll. Swinhoe.

311. *Ozarba mallarba.*

Ozarba mallarba, Swinhoe, P. Z. S., 1885, p. 452, pl. 27, f. 3.

Thyetmyo, October, 1887. In coll. Swinhoe.

312. *Tarache imbuta.*

Erastria imbuta, Walker, xxxiii., p. 794 (1865).
Acontia acerba, Felder & R., Reise Nov. Lep., pl. 108, f. 25 (1872).

(Type). Moulmein. In B. M.

313. *Tarache bætica*, n. sp.

Grey, suffused with brownish; last joint of palpi black with pale tips; some black marks on top of head, and a black band on collar. Fore wings with a black patch on costa near the base, a broad band across centre of wing, a very little beyond the middle, black above, and becomes suffused and brownish below, limited on both sides by white sinuous lines, which pass round the orbicular and reniform, which are large and whitish, a broad black apical band, suffused downwards and inwards, reniform containing a black mark, costa with three pale points near apex. Hind wings brownish, unmarked. Expanse of wings, $\frac{6}{10}$ in.

Rangoon, May and June, 1888. In coll. Swinhoe.

Allied to *Tarache signifera*, Walker; bands somewhat similiarly disposed, but is much smaller and browner, and is altogether differently marked on the costa.

314. *Tarache optiva*, n. sp.

Of a uniform clear pale iron-grey colour; last joint of palpi brown; top of head whitish. Fore wings with a broad medial band slightly darker than the ground colour, and limited on both sides with white sinuous lines, the inner one outwardly and the outer one inwardly edged with blackish; marginal line on both wings dark iron-grey. Hind wings unmarked. Expanse of wings, $\frac{1}{2}$ in.

Rangoon, July and September, 1888. In coll. Swinhoe.

Differs from the above in the uniform iron-grey coloration of both wings and central uniform band on fore wings.

315. *Bagada diffisa*, n. sp. (Pl. VII., fig. 17).

Palpi pale yellowish, brown at the sides and tips. Antennæ, body, and wings of a uniform pale reddish fawn-colour. Fore wings with three indistinct pale brown lines; ante-medial, medial, and post-medial at equal distances, the last line with small brown dots between the veins; outer margin with a broad brownish band, its

inner margin curving inwards below the centre, where there is a largish brown spot; marginal border with black points in yellow spots on the veins. Hind wings pinkish brown, paling towards the base; fringe pale pinkish. Expanse of wings, $1\frac{3}{10}$ in.

Bhamo, October, 1882. In coll. Swinhoe.

Has no near ally that I am aware of.

ORTHOSIIDÆ.

316. *Orthosia sinens.*

Orthosia sinens, Walker, xi., p. 746 (1857).

(Type). Moulmein. In B. M.

317. *Elydna transversa.*

Elydna transversa, Walker, xv., p. 1713 (1858).

(Type). Moulmein. In B. M.

318. *Aramuna lutosa*, n. sp. (Pl. VII., fig. 11).

♂. Obscure pinkish grey, irrorated with cinereous grey atoms; top of head greyish white. Fore wings with the internal border limited by the submedian vein, dark greyish purple, with a dark basal patch caused by an intervening tuft of subbasal grey hairs on the inner margin, a brown spot on the costal third, a collection of grey atoms forming a band across the centre, omitting a pale space with a black dot at the end of the cell, a discal line of three or four well-separated black lunules, followed by some more clusters of grey atoms, and a line of disconnected black lunules on the margin. Hind wings pale grey, brownish towards apical border. Expanse of wings, $1\frac{4}{10}$ in.

Rangoon, August, 1888. In coll. Swinhoe.

Widely different from *A. marginata*, Moore, from Ceylon, the only other described species of this genus, in its sombre coloration and absence of the dark marginal borders of fore wings.

HADENIDÆ.

319. *Hadena spargens.*

Hadena spargens, Walker, xxxiii., p. 739 (1865).

(Type). Moulmein. In B. M.

NOCTUIDÆ.

320. *Spælotis uniformis*, n. sp.

Palpi, antennæ, head, thorax, and fore wings of a uniform greyish fawn-colour, irrorated with very minute greyish atoms, and with a few fine black atoms on the fore wings; costa with some faint grey marks; marginal points pale grey; fringe interlined with grey; median vein and veinlets greyish. Hind wings whitish, with fawn-coloured veins, costal space, and outer margin; cilia interlined, and with white tips. Abdomen whitish, shining Expanse of wings, $1\frac{3}{10}$ in.

Bhamo, October, 1882. In coll. Swinhoe.

Allied to *S. sincera*, Swinhoe, but differs in the absence of the lines on the fore wing, and in the fawn-coloured suffusion of the borders of the hind wings.

APAMIIDÆ.

321. *Berresa natalis*.

Berresa natalis, Walker, xvi., p. 214 (1858).

Moulmein, May, 1888; Rangoon, September, 1888. In coll. Swinhoe.

322. *Ilattia cephusalis*.

Ilattia cephusalis, Walker, xvi., p. 209 (1858).
Miana inornata, Walker, xxxii., p. 677 (1865).
Perigea leucospila, Walker, xxxii., p. 683.

Rangoon, October, 1888. In coll. Swinhoe.

323. *Perigea centralis*.

Perigea centralis, Walker, xi., p. 734 (1857).
Celæna serva, Walker, xv., p. 1689 (1858).
Perigea illecta, Walker, xxxii., p. 684 (1865).
P. canorufa, Walker, xxxii., p. 683.
Hadena spargens, Walker, xxxiii., p. 739 (1865).
H. taprobana, Felder & R., Reise Nov. Lep., pl. 110, f. 3 (1872).

Rangoon, July, 1888. In coll. Swinhoe.

324. *Perigea dolorosa*.

Mamestra dolorosa, Walker, xxxii., p. 667 (1865).

Rangoon, July, 1888. In coll. Swinhoe.

325. *Amyna selenampha.*

Amyna selenampha, Guén., Noct., i., 406, 378 (1852).
Alamis spoliata, Walker, xiii., p. 1050 (1857).
Hadena latipennis, Walker, xxxiii., p. 738 (1865).

(Type, *spoliata*). Moulmein. In B. M.
Moulmein, July, 1888. In coll. Swinhoe.
Rangoon, June and July, 1888. In Phayre Museum, Rangoon.

326. *Spodoptera cilium.*

Spodoptera cilium, Guén., Noct., i., 156, 249 (1852).
S. insulsa, Walker, xxxii., p. 648 (1865).

Bassein, August, 1888. In Phayre Museum, Rangoon.

327. *Prodenia littoralis.*

Hadena littoralis, Boisd., Faun. Ent. Madag. Lep., p. 91, pl. 13, f. 8 (1834).
Neuria retina, Freyer, Beitr. Schm., v., p. 161, pl. 478, f. 2, 3 (1846).
Prodenia ciligera, Guén., Noct., i., 164, 260 (1852).
P. testaceoides, Guén., *l. c.*, No. 262, pl. 6, f. 7.
P. glaucistriga, Walker, ix., p. 197 (1856).
P. subterminalis, Walker, ix., p. 196.
P. declinata, Walker, xi., p. 723 (1857).

Moulmein. In B. M.
Rangoon. In coll. Swinhoe.

328. *Prodenia nubes.*

Spodoptera nubes, Guén., Noct., i., 155, 246 (1852).
S. filium, Guén., *l. c.*, No. 248.
Prodenia infecta, Walker, ix., p. 196 (1856).
P. insignata, Walker, ix., p. 197.
Agrotis transducta, Walker, x., p. 344 (1856).
Laphygma squalida, Walker, xxxii., p. 652 (1865).
Prodenia venustula, Walker, xxxii., p. 654.
Agrotis submarginalis, Walker, xxxii., p. 699.
Prodenia permunda, Walker, xi., p. 723 (1857).

Moulmein, June, 1888. In Phayre Museum, Rangoon.
Rangoon. In coll. Swinhoe.

329. *Laphygma exigua.*

Noctua exigua, Hübn., Samml. Eur. Schm. Noct., f. 362 (1810).

Rangoon, August, 1888. In Phayre Museum, Rangoon.

PLUSIIDÆ.

330. *Plusia signata.*

Noctua signata, Fabr., Ent. Syst., iii., 2, 81 (1794).

Rangoon, October, 1888. In coll. Swinhoe.

331. *Plusia verticillata.*

Plusia verticillata, Guén., Noct., ii., 344, 1168 (1852).

Rangoon, October and November, 1888. In coll. Swinhoe.

332. *Plusiodonta auripicta.*

Plusiodonta auripicta, Moore, Descr. Ind. Lep. Atk., ii., p. 150 (1882).

Rangoon, June and July, 1888. In coll. Swinhoe.

333. *Plusiodonta chalsytoides.*

Plusiodonta chalsytoides, Guén., Noct., ii., 360, 1201 (1852).

Deva conducens, Walker, xii., p. 963 (1857).

Plusia agens, Felder & R., Reise Nov. Lep., iv., pl. 110, f. 32 (1872).

Rangoon, August, September, and October, 1888. In coll. Swinhoe.

EURHIPIDÆ.

334. *Targalla infida.*

Targalla infida, Walker, xiii., p. 1008 (1857).

Penicillaria ludatrix, Walker, xv., p. 1773 (1858).

(Type). Moulmein. In B. M.

335. *Anuga lunulata.*

Anuga lunulata, Moore, P. Z. S., 1867, p. 62.

Rangoon, January, 1887; September, 1888. In coll. Swinhoe.

ERIOPIDÆ.

336. *Callopistria duplicans.*

Callopistria duplicans, Walker, xii., p. 866 (1857).

(Type). Moulmein. In B. M.

337. *Callopistria recurvata.*

Callopistria recurvata, Moore, Descr. Ind. Lep. Atk., ii., p. 144 (1882).

Rangoon, July, 1888. In coll. Swinhoe.

HYBLÆIDÆ.

338. *Hyblæa constellata.*

Hyblæa constellata, Guén., Noct., ii., 391, 1251 (1852).

Tavoy. In I. M., Calcutta.

339. *Hyblæa firmamentum.*

Hyblæa firmamentum, Guén., Noct., ii., 392, 1253, ♂ (1852).

H. tenebrionis, Felder & R., Reise Nov. Lep., pl. 111, f. 11, ♀ (1872).

Mandalay. In coll. Swinhoe.

340. *Hyblæa puera.*

Phalæna puera, Cram., Pap. Exot., ii., pl. 103, f. D, E (1777).

Noctua saga, Fabr., Mant. Ins., ii., 137, 29 (1787).

N. unxia, Hübn., Eur. Schm. Noct., fig. 513 (1810).

Heliothis apricans, Boisd., Faun. Ent. Madag., p. 98, pl. 15, f. 7 (1834).

Moulmein. In B. M.

Bassein, August, 1888. In coll. Swinhoe.

GONOPTERIDÆ.

341. *Cosmophila xanthindyma.*

Cosmophila xanthindyma, Boisd., Faun. Ent. Madag. Lep., 94, pl. 13, f. 7 ♂ (1834).

C. indica, Guén., Noct., ii., 396, 1256, ♀ (1852).

C. variolosa, Walker, xi., p. 750 (1857).

Cirrœdia edentata, Walker, xi., p. 750.

Rangoon, October, 1888. In coll. Swinhoe.

342. *Arthisma scissuralis.*

Arthisma scissuralis, Moore, P. Z. S., 1883, p. 20.

Bhamo, October, 1882. Rangoon, July, 1888. In coll. Swinhoe.

343. *Rusicada brunnea*, n. sp. (Pl. VIII., fig. 2, ♀).

Gonitis brunnea, Moore, Descr. Ind. Lep. Atk., ii., p. 153, ♂ (1882).

♀. Olive-brown; palpi yellowish below and at the tips of the second joints. Fore wing with an indistinct incomplete brown band or diffusely sinuous line before the middle, which is more apparent on the lower portion; a blackish indistinct spot in the centre of the cell, a blackish lunule edged outwardly with whitish closing the cell, a black sinuous post-medial line edged outwardly with whitish, a submarginal sinuous row of black points edged with whitish, a large apical whitish patch and marginal whitish lunular line, four pale points on the costa towards the apex; fringe brown. Hind wings unmarked, whitish at the base; cilia pale pinkish, interlined with brown. Abdomen pale at the base. Under side pale pinkish grey, suffused with pale brown in the lower central portion of fore wings; apical costal points distinct, and a recurved black post-medial line across both wings; tarsi brown, banded with white. Expanse of wings, $1\frac{6}{10}$ in.

Bassein, August, 1888. In coll. Swinhoe.

344. *Rusicada albitibia*.

Gonitis albitibia, Walker, xiii., p. 1001 (1857).
Rusicada nigritarsis, Walker, xiii., p. 1006.
Rangoon, July and October, 1888. In coll. Swinhoe.

345. *Gonitis latimargo*.

Gonitis latimargo, Walker, xiii., p. 1002 (1857).
(Type). Moulmein. In B. M.

346. *Gonitis metaxantha*.

Gonitis metaxantha, Walker, xiii., p. 1005 (1857).
Rangoon, September, 1885. In coll. Swinhoe.

347. *Thalatta precedens*.

Thalatta precedens, Walker, xiii., p. 996 (1857).
(Type). Moulmein. In B. M.

AMPHIPYRIDÆ.

348. *Blenina accipiens*.

Blenina accipiens, Walker, xiii., p. 1215 (1857).
Rangoon, September, 1888. In coll. Swinhoe.

CATOCALIDÆ.

349. *Catocala albifascia.*

Catocala albifascia, Walker, xxxiii., p. 993 (1863).
(Type). Moulmein. In B. M.
Rangoon. In coll. Moore.

TOXOCAMPIDÆ.

350. *Toxocampa metaspila.*

Toxocampa metaspila, Walker, xiii., p. 1032 (1857).
Rangoon, June, 1888. In coll. Swinhoe.

POAPHILIDÆ.

351. *Poaphila marginata.*

Poaphila marginata, Walker, xxxiii., p. 991 (1865).
(Type). Moulmein. In B. M.

352. *Phurys enervis*, n. sp. (Pl. VIII., fig. 8).

Greyish brown; palpi at the sides and antennæ blackish brown. Wings shaped as in *Sanys rivulosa*, Walker, slightly curving in below the semi-falcated apex; a black dot for the reniform, a whitish thin transverse ear-shaped mark, faintly brown-ringed, for the orbicular; both wings with many transverse faint brown shades, the only ones distinguishable without a glass being—1st, one-third from base, faint on fore wings, not visible on hind wings; 2nd, central double-lined across both wings, with the interspace darker; 3rd, from apex of fore wings to abdominal margin of hind wings just beyond the middle; a straight distinct pale yellowish line from costa near apex to abdominal margin near anal angle; brown marginal line and blackish points; cilia with pale basal line. Expanse of wings, $1\frac{4}{10}$ in.

Rangoon, September, 1888. In coll. Swinhoe.

Allied to *P. strigata*, Moore; differs much in its smaller size, straight bands, and submarginal pale line across both wings, *P. strigata* having no bands or lines on the hind wing.

353. *Phurys strigata.*

Phurys strigata, Moore, P. Z. S., 1867, p. 80.
Rangoon. June and July, 1888. In coll. Swinhoe.

354. *Arasada lycaugesaria*, n. sp.

Palpi, antennæ, and head brown. Body and wings pinkish white; a brown thin band on the collar in front, a brown band across the centre of the thorax. Abdomen with thin segmental bands of white edged with brown, a broader brown band in the centre corresponding to the brown band on the hind wings. Wings sparsely irrorated with chocolate-brown atoms. Fore wings with the costal line chocolate-brown; a subcostal streak of that colour from the base to the apex, three black subapical points on the costa, also black marginal points, and the irrorations thicker towards the margin, giving it a slightly darker tint, a straight band from the outer margin just above the hinder angle of the fore wings to the centre of the abdominal margin of the hind wings, followed on the latter by a pure white band, with a small outward angle in its centre, and lined on both sides with black, then a small pale space with some black atoms in it, the whole of the hind wing darker than the fore wing, but paling towards its base, and with a suffused dark band in the marginal space, duplex in parts, and running to the outer and apical margins, with a blackish spot near the latter; marginal points black; fringe marked with brown. Expanse of wings, 1 in.

Rangoon, August, 1888. In coll. Swinhoe.

Allied to *A. ruptifascia*, Moore; can be easily distinguished by its longitudinal bands, which makes the insect look much like *Lycauges postvittata*, a Geometrite of the family *Idæidæ*.

355. *Nasaya hepatica*.

Nasaya hepatica, Moore, Descr. Ind. Lep. Atk., ii., p. 173 (1882).

Rangoon, July, 1888. In coll. Swinhoe.

356. *Dierna acanthusalis*.

Dierna acanthusalis, Walker, xvi., p. 205 (1858).
Nahara clavifera, Walker, xxxiii., p. 1004 (1865).
(Type, *clavifera*). Moulmein. In B. M.

CATEPHIDÆ.

357. *Felinia spissa*.

Felinia spissa, Guén., Noct., iii., 322, 1783 (1852).
Briarda decens, Walker, xiii, p. 1098 (1857).

Bassein. Sept., 1888. In Phayre Museum, Rangoon.

358. *Arcte cærulea.*

Cocytodes cærulea, Guén., Noct., iii., 41, 1370, pl. 13, f. 10 (1852).

Mandalay. In coll. Swinhoe.

This insect has been for years in the B. M. wrongly labelled *A. modesta*, Van der Hœven, and a larger *Arcte* with a broad black zigzag linear fascia as *A. cærulea*, Guén.; but, as Mr. Moore pointed out to me, a glance at Guenée's plate ought to be sufficient to put the matter right.

359. *Catephia linteola.*

Catephia linteola, Guén., Noct., iii., 44, 1375 (1852).

Moulmein. In B. M.

Rangoon, July, 1888. In coll. Swinhoe.

360. *Hypospila bolinoides.*

Hypospila bolinoides, Guén., Noct., iii., 358, 1832 (1852).

Thermesia signipalpis, Walker, xv., p. 1572 (1858).

Rangoon, April and October, 1888. In coll. Swinhoe.

Mergui. In I. M., Calcutta.

361. *Mosara lateralis.*

Anophia lateralis, Walker, xxxiii., p. 917 (1865).

Mosara apicalis, Walker, xxxiii., p. 1032 (1865).

Rangoon, September, 1888. In Phayre Museum, Rangoon.

(Type, *lateralis*). Moulmein. In B. M.

362. *Anophia longinquua*, n. sp.

Blackish brown, irrorated slightly with grey; dorsal tufts on abdomen paler than the abdomen, which is nearly black; some white hairs at the base. Fore wings with several transverse indistinct blackish sinuous and partly dentated lines; costa with yellowish subapical points, orbicular and reniform whitish, indistinct, former minute, latter large, ear-shaped. Hind wings slightly paler than fore wings, without lines or marks, but with a large white spot in the centre. Under side paler, a black marginal lunular line and white points and whitish fringe, and a white central abbreviated band on both wings. Expanse of wings, 1 in.

Rangoon, August, 1888. In coll. Swinhoe.

Allied to *A. olivescens*, Guérin, from which it principally differs in its smaller size, and in the colour of the hind wings being blackish brown with a white central spot instead of half-brown and half-white, as in that species.

363. *Anophia undara*, n. sp.

Blackish brown. Fore wings with five pale yellowish points on costa towards the apex, with many black marks on the costa, and the entire wing with numerous deep black sinuous lines across the wing; marginal line deep black, lunular with black central spots. Hind wings darker than the fore wings, unmarked; fringe of hind wings interlined, and with a pale basal line. Under side paler, uniformly coloured, except towards hinder margin of fore wings, which is whitish, the pale points on the costa more distinct, black streaks between the veins on the outer portions of both wings and fringe deeply interlined with black. Expanse of wings, 1 in.

Rangoon, August, 1888. In coll. Swinhoe.

Allied to *A. longinquua*, but quite distinct in the markings, and with no white spot or bands above or below.

364. *Stictoptera illucida*.

Stictoptera illucida, Walker, xxxiii., p. 918 (1865).
S. chalybea, Butler, P. Z. S., 1883, p. 163.
(Type, *illucida*). Moulmein. In B. M.

365. *Stictoptera grisea*.

Stictoptera grisea, Moore, P. Z. S., 1867, p. 67.
Burma. In coll. Swinhoe.

366. *Erygia apicalis*.

Erygia apicalis, Guén., Noct., iii., 50, 1381 (1852).
Calicula exempta, Walker, xv., p. 1808 (1858).
(Type of *exempta*). Moulmein. In B. M.

367. *Odontodes aleuca*.

Odontodes aleuca, Guén., Noct., iii., 51, 1382 (1852).
Briarda bolinoides, Walker, xv., p. 1802 (1858).
Steira subfasciata, Walker, xxxiii., p. 922 (1865).
S. quadristrigata, Walker, xxxiii., p. 923.

(Types of *bolinoides* and *subfasciata*). Moulmein. In B. M.

Rangoon, August, 1886; September, 1888. In coll. Swinhoe.

A very variable insect. Undoubtedly all the above are one and the same species.

368. *Lophoptera costata.*

Lophoptera costata, Moore MS., Butler, P. Z. S., 1883, p. 163.

Rangoon, October, 1888. In coll. Swinhoe.

HYPOGRAMMIDÆ.

369. *Dinumma mystica.*

Dinumma mystica, Walker, xv., p. 1807 (1858).

(Type). Moulmein. In B. M.

370. *Dinumma placens.*

Dinumma placens, Walker, xv., p. 1806 (1858).

Rangoon, June, 1888. In coll. Swinhoe.

371. *Gadirtha impingens.*

Gadirtha impingens, Walker, xiii., p. 1103 (1857).

(Type). Moulmein. In B. M.

372. *Gadirtha inexacta.*

Gadirtha inexacta, Walker, xiii., p. 1102 (1857).

(Type). Moulmein. In B. M.

373. *Hypogramma quadrinotata.*

Hypogramma quadrinotata, Walker, xxxiii., p. 893 (1865).

(Type). Moulmein. In B. M.

374. *Selepa curiosa*, n. sp.

Pinkish grey. Palpi brown at the sides and tips. Antennæ, two lines on the collar, and spot in front of thorax, dark brown. Abdomen with white segmental lines and brown bands. Fore wings suffused in parts with white, thickly so at the base, upper and outer portions, some basal indistinct brown marks, a duplex

curved brown band of thick lines, bent inwards from the hinder margin one-third from the base, then curving outwardly and above and in on to the costa at one-fourth from the base; a fine sinuated nearly upright central line, a fine dentated discal line curving somewhat like the band, outwardly margined with pale pinkish white; a submarginal lunular line with white points, well separated from the margin, and outside of it at the apex is a large brown patch; marginal points black; fringe pale pinkish white, with some brown longitudinal streaks; a fine lunule at the end of the cell with a spot behind it. Hind wing white, brownish grey towards the apical border. Expanse of wings, 9½-10ths in.

Rangoon, July, 1888. In coll. Swinhoe.

In the shape of its wings it is somewhat similar to *Selepa vitea*, Swinhoe, but in coloration and markings quite distinct from all other described species of this genus.

375. *Selepa celtis*.

Selepa celtis, Moore, Cat. E. Lep. I. C., ii., p. 353, pl. 9*a*, f. 9, and pl. 16, f. 8, 8*a*, larva (1859).

Subrita curriferella, Walker, xxxv., p. 1745 (1866).

Rangoon. In Phayre Museum, Rangoon.

376. *Selepa vitea*.

Selepa vitea, Swinhoe, P. Z. S., 1885, p. 460, pl. 27, f. 17.

Rangoon. In coll. Swinhoe.

All the insects of this genus have three free veins in the hind wing like a *Pyrale*, but otherwise they are true Noctuids, and the larva is that of a Hypogrammid.

377. *Symitha punctata*, n. sp. (Pl. VII., fig. 15).

Antennæ brown; general coloration pale pinkish grey, irrorated with chocolate-brown; tips of palpi whitish. Fore wing with the irrorations in parts rather dense, forming indistinct incomplete transverse shades, spots black, one or two on the thorax, one at the base of fore wing, three in a row subbasal, first on the costa, second below near it, third in the interno-median area one-third from base, another in the centre above the submedian vein; a submarginal and a marginal row of spots, one or two of them at the apex, forming short streaks. Hind wing whitish on the costa, brownish towards the exterior border; fringe of both wings interlined. Expanse of wings, $\frac{9}{10}$ in.

Rangoon, June, 1886. In coll. Swinhoe.

There is an example of this insect in Mr. Moore's collection from Darjiling. Distinguishable from all other species of this genus by the spotted nature of the fore wings.

378. *Cletthora mirabilis*, n. sp.

Reddish fawn-colour. Body and fore wings suffused with white, lightly tinged with pale pinkish. Abdomen grey, with the segments clearly defined. Fore wings with the subcostal, median, and outer veins prominent, thickly suffused with whitish on the space below the median vein, and irrorated with black atoms; an indistinct outwardly curved row of subbasal spots, two white recurved slightly sinuous lines, ante-medial and discal, a blackish space against the outer part of the outer line near the hinder angle. Hind wings more red than the fore wings, paling at the base. Expanse of wings, $\frac{8}{10}$ in.

Rangoon, August, 1888. In coll. Swinhoe.

Allied to *Cletthora valida*, Walker, from Borneo; differs in the absence of the black streaks and the white transverse curved lines.

379. *Cletthora bilinea*, n. sp.

Palpi brownish; two last joints with pale tips. Antennæ brown above, pale beneath. Body purplish brown; top of the head, a spot on the collar, sides and base of thorax, and tips of abdomen with the anal tuft, pale pinkish grey; ground colour of fore wings pale pinkish grey, mostly suffused with purplish brown, with pale spaces in parts of the centre and outer portions; median and outer veins prominent; a large black lunular mark at end of cell, and a small spot inside it, two pale transverse erect lines, ante-medial and discal, the former bent inwards below the median vein, and curving outwardly above and in on to the costa, the latter nearly straight, curving very slightly inwards, a row of black dots in a pale suffused band between this line and the margin, the centre spots most prominent; cilia brown. Hind wings reddish in the centre, purplish brown on the costal and abdominal portions; cilia purplish brown, with a pale basal line. Expanse of wings, 1 in.

Rangoon, August, 1888. In coll. Swinhoe.

Allied to *C. mirabilis*, but can easily be distinguished by the two pale transverse lines.

POLYDESMIDÆ.

380. *Pandesma jubra.*

Pandesma jubra, Swinhoe, P. Z. S., 1889, p. 413, pl. xliv., f. 4.

Rangoon, June, 1888. In coll. Swinhoe.

381. *Polydesma boarmoides.*

Polydesma boarmoides, Guén., Noct., ii., 441, 1314 (1852).

P. mastrucata, Felder & R., Reise Nov. Lep., pl. 111, f. 31 (1872).

Rangoon, June, 1888. In Phayre Museum, Rangoon.

HOMOPTERIDÆ.

382. *Homoptera solita.*

Homoptera solita, Walker, xiii., p. 1068 (1857).

(Type). Moulmein. In B. M.

383. *Girpa fraterna.*

Girpa fraterna, Moore, Lep. Ceylon, iii., p. 94, pl. 156, figs. 5, 5*a* (1884).

Rangoon, July, 1888. In coll. Swinhoe.

384. *Girpa inangulata.*

Hulodes inangulata, Guén., Noct., iii., 210, 1612 (1852).

Remigia optativa, Walker, xiv., p. 1510 (1858).

R. optatura, Walker, xv., p. 1848 (1858).

R. comitata, Walker, xxxiii., p. 1018 (1865).

Hulodes umbrosa, Walker, Char. Undescr. Lep. Het., p. 91 (1869).

Rangoon, July, 1888. In coll. Swinhoe.

385. *Girpa pertendens.*

Remigia pertendens, Walker, xiv., p. 1512 (1858).

Rangoon, June, 1888. In Phayre Museum, Rangoon.

OPHIDERIDÆ.

386. *Othreis ancilla.*

Phalæna (*Noctua*) *ancilla*, Cram., Pap. Exot., ii., pl. 149, f. F (1777).

Ophiusa strigata, Donov., Ins. Ind., pl. 54, f. 2 (1838).
Othreis homœna, Hübn., Verz. Bek. Schm., 264, 2597 (1816).
Ophideres bilineosa, Walker, xiii., p. 1227 (1857).
Rangoon. In coll. Swinhoe.

387. *Othreis cajeta.*

Phalæna (*Noctua*) *cajeta*, Hübn., Verz. Bek. Schm., 265, 2599 (1816).
Ophideres multiscripta, Walker, xiii., p. 1226 (1857).
Moulmein. In B. M.

388. *Othreis fullonica.*

Phalæna (*Noctua*) *fullonica*, Linn., Syst. Nat., ii., 812, 16 (1767).
Noctua discoreæ, Fabr., Sp. Ins., ii., 212, 15 (1781).
Phalæna (*Noctua*) *pomona*, Cram., Pap. Exot., i., pl. 77, f. c (1776).
Tavoy. In I. M., Calcutta.
Moulmein, in B. M.

389. *Rhytia hypermnestra.*

Phalæna (*Noctua*) *hypermnestra*, Cram., Pap. Exot., iv., pl. 323, f. A, B (1780).
Moulmein. In B. M.

390. *Phyllodes consobrina.*

Phyllodes consobrina, Westw., Cab. Or. Ent., p. 57, pl. 28, f. 2 (1848).
Moulmein. In B. M.

391. *Phyllodes verhuellii.*

Phyllodes verhuellii, Voll., Tijd. Voor. Ent., i., p. 166, pl. 8 (1858).
Tavoy. In I. M., Calcutta.

392. *Ischyja manlia.*

Phalæna (*Noctua*) *manlia*, Cram., Pap. Exot., i., pl. 92, f. A (1776).
Moulmein. In B. M.

393. *Ischyja schlegelii.*

Ischyja schlegelii, Snellen, Tijd. Voor. Ent., 1885, p. 4, pl. 1, f. 2.

Rangoon, July, 1888. In coll. Swinhoe.

394. *Lygniodes hypoleuca.*

Lygniodes hypoleuca, Guén., Noct., iii., 125, 1500 (1852).

Moulmein. In B. M.

EREBIIDÆ.

395. *Oxyodes scrobiculata.*

Noctua scrobiculata, Fabr., Sp. Ins., ii., 212, 14 (1781).
Phalæna (*Noctua*) *clytia*, Cram., Pap. Exot., iv., pl. 399, f. G (1782).

Rangoon, September and November, 1888. In coll. Swinhoe.

396. *Sypna apicalis.*

Sypna apicalis, Butler, Trans. Ent. Soc. Lond., 1881, p. 206.

Tavoy. In I. M., Calcutta.

OMMATOPHORIDÆ.

397. *Patula macrops.*

Phalæna (*Attacus*) *macrops*, Linn., Syst. Nat., xii., iii., 225 (1768).
Noctua bubo, Fabr., Sp. Ins., ii., 209, 3 (1781).
Patula boopis, Guén., Noct., iii., 178, 1560 (1852).

Moulmein. In B. M.
Rangoon, June, 1886. In coll. Swinhoe.

398. *Argiva caprimulgus.*

Noctua caprimulgus, Fabr., Sp. Ins., ii., 210, 6 (1781).
Nyctipao exterior, Walker, xiv., p. 1306 (1858).
N. obliterans, Walker, xiv., p. 1307.

Moulmein. In B. M.
Tavoy. In I. M., Calcutta.
Rangoon. In coll. Swinhoe.

399. *Argiva hieroglyphica.*

Phalæna (*Noctua*) *hieroglyphica*, Drury, Ins. Exot., ii., p. 3, pl. 2, f. 1, ♀ (1773).
P. (*Noctua*) *mygdonia*, Cram., Pap. Exot., ii., pl. 174, f. F (1777).
P. (*Noctua*) *hermonia*, Cram., *l. c.*, f. E.
Noctua ulula, Fabr., Sp. Ins., ii., 211, 9 ♂ (1781).

Moulmein, in B. M.
Mergui. In I. M., Calcutta.

400. *Nyctipao crepuscularis.*

Phalæna crepuscularis, Linn., Syst. Nat., x., p. 509 (1758).
Nyctipao lætitia, Butler, Ill. Typ. Lep. Het. B. M., iii., p. 26, pl. 47, f. 9 (1879).

Moulmein. In B. M.
Tavoy and Mergui. In I. M., Calcutta.

401. *Entomogramma fautrix.*

Entomogramma fautrix, Guén., Noct., iii., 204, 1604 (1852).

Upper Tenasserim. In I. M., Calcutta.

402. *Speiredonia retrahens.*

Speiredonia retrahens, Walker, xiv., p. 1294 (1858).
Sericia parvipennis, Walker, xiv., p. 1297.
Ommatophora albifascia, Walker, xxxiii., p. 947 (1865).
Speiredonia conspicua, Felder & R., Reise Nov. Lep., pl. 113, f. 7 (1873).

Rangoon, July, 1888. In coll. Swinhoe.

403. *Speiredonia zamis.*

Phalæna (*Noctua*) *zamis*, Stoll, Cram., Pap. Exot., v., p. 162, pl. 36, f. 11 (1790).

Rangoon, June, 1888. In coll. Swinhoe.

404. *Sericia anops.*

Sericia anops, Guén., Noct., iii., 173, 1564 (1852).

Rangoon. In Phayre Museum, Rangoon.

HYPOPYRIDÆ.

405. *Spiramia cohærens.*

Spiramia cohærens, Walker, xiv., p. 1321 (1858).
(Type). Moulmein. In B. M.
Rangoon, July, 1888. In coll. Swinhoe.

406. *Spiramia helicina.*

Speiredonia helicina, Hübn., Zütr. Samml. Exot. Schm., iii., 14, 219, figs. 437—8 (1825).
Rangoon, July, 1888. In coll. Swinhoe.

407. *Hypopyra vespertilio.*

Noctua vespertilio, Fabr., Mant. Ins., ii., 136, 16, ♂ (1787).
Hypopyra shiva, Guén., Noct., iii., 199, 1597, ♀ (1852).
Moulmein. In B. M.
Rangoon, July, 1888. In coll. Swinhoe.

408. *Hypopyra unistrigata.*

Hypopyra unistrigata, Guén., Noct., iii., 201, 1601 (1852).
Maxula idonea, Walker, xxxii., p. 1096 (1865).
Angerona polusaria, Walker, xx., p. 243 (1860).
Moulmein. In B. M.

BENDIDÆ.

409. *Hulodes drylla.*

Hulodes? drylla, Guén., Noct., iii., 209, 1609, pl. 24, f. 10 (1852).
Hypopyra restorans, Walker, xiv., p. 1328 (1858).
Moulmein. In B. M.
Rangoon, July, 1888. In coll. Swinhoe.

410. *Hulodes saturnioides.*

Hulodes saturnioides, Guén., Noct., iii., 209, 1610 (1852).
H. saturnioides, var., Walker, xiv., p. 1336 (1858).
(Var. type). Moulmein. In B. M.

411. *Hamodes discistriga.*

Hypernaria discistriga, Moore, P. Z. S., 1867, p. 78.

Rangoon, July, 1888. In coll. Swinhoe.

412. *Hamodes unilinea*, n. sp.

Fawn-colour; palpi brown, collar reddish. Abdomen with thin brown bands on the segments. Wings irrorated with black atoms; costa of fore wings pale; a pale slightly sinuous line across both wings from the costa of fore wings one-third from the apex to the abdominal margin of hind wings, one-third from the anal angle, the veins outside this line pale and rather prominent; a brownish indistinct patch on the fore wings outside the line touching the hinder margin, and a row of submarginal black dots on both wings. Expanse of wings, $1\frac{8}{10}$ in.

Beeling, March, 1886. In coll. Swinhoe.

Differs from *H. discistriga* in its smaller size, difference of colour, and the transverse line being sinuous and going evenly across the wings to the costa one-third from apex, whereas *discistriga*, which is yellowish, has a red line across the wings, nearly straight, and extending to the apex.

OPHIUSIDÆ.

413. *Melioptis cyllaria.*

Phalæna (*Noctua*) *cyllaria*, Cram., Pap. Exot., iii., pl. 251, f. c, d (1779).

Rangoon, May, 1886. In coll. Swinhoe.

414. *Melioptis cyllota.*

Achæa cyllota, Guén., Noct., iii., 248, 1669 (1852).

A. signivitta, Walker, xiv., p. 1398 (1858).

Moulmein. In B. M.

415. *Melioptis pannosa.*

Ercheia pannosa, Moore, P. Z. S., 1883, p. 24.

Rangoon, July, 1888. In Phayre Museum, Rangoon.

416. *Thyas dotata.*

Noctua dotata, Fabr., Ent. Syst., iii., 2, 55, 153 (1794).

Moulmein. In B. M.

Hpongadoo, April, 1886. In coll. Swinhoe.

417. *Thyas honesta.*

Thyas honesta, Hübn., Samml. Exot. Schm., ii., Index, p. 4, figs. 1—2 (1820—26).

Rangoon, July, 1888. In coll. Swinhoe.

418. *Minucia tumidilinea.*

Ophiusa tumidilinea, Walker, xiv., p. 1433 (1858).

Rangoon, June and July, 1888. In coll. Swinhoe.

419. *Ophisma contenta.*

Ophisma contenta, Walker, xiv., p. 1381 (1858).

(Type). Moulmein. In B. M.

Rangoon, June and July, 1888. In coll. Swinhoe.

420. *Ophisma certior.*

Ophisma certior, Walker, xiv., p. 1381 (1858).

(Type). Moulmein. In B. M.

421. *Ophisma gravata.*

Ophisma gravata, Guén., Noct., iii., 237, 1648 (1852).

Rangoon, August, 1888. In Phayre Museum, Rangoon.

422. *Pindara illibata.*

Noctua illibata, Fabr., Syst. Ent., 592, 8 (1775).

Hemeroblemma peropace, Hübn., Zütr. Samml. Exot. Schm., iii., 33, 271, figs. 541—2 (1825).

Ophisma lætabilis, Guén., Noct., iii., 241, 1657 (1852).

Moulmein. In B. M.

Rangoon, July, 1888. In coll. Swinhoe.

423. *Achæa combinans.*

Achæa combinans, Walker, xiv., p. 1399 (1858).

Rangoon, September, 1888. In coll. Swinhoe.

424. *Achæa melicerte.*

Phalæna (*Noctua*) *melicerte*, Drury, Ins., i., p. 46, pl. 23, f. 1 (1770).

Noctua tigrina, Fabr., Sp. Ins., 218, 52 (1781).

Moulmein. In B. M.

Rangoon, June and August, 1888. In coll. Swinhoe.

425. *Achæa serva.*

Noctua serva, Fabr., Syst. Ent., 593, 13 (1775).
N. vulpina, Fabr., Ent. Syst., iii., 2, 39, 102 (1794).
N. mercatoria, Fabr., *l. c.*, p. 62, No. 175.
Achæa ino, Hübn., Verz. Bek. Schm., 269, 2644 (1816).

Rangoon, October, 1888. In Phayre Museum, Rangoon.

426. *Psimada quadripennis.*

Psimada quadripennis, Walker, xv., p. 1828 (1858).

Rangoon, September, 1888. In coll. Swinhoe.

427. *Naxia calefaciens.*

Naxia calefaciens, Walker, xiv., p. 1405 (1858).

Rangoon, October, 1888. In Phayre Museum, Rangoon.

428. *Delgamma calorifica.*

Naxia calorifica, Walker, xiv., p. 1406 (1858).

Rangoon, July, 1888. In coll. Swinhoe.

429. *Caranilla onelia.*

Naxia onelia, Guén., Noct., iii., 258, 1679 (1852).
Ophiusa obumbrata, Walker, xxxiii., p. 969 (1858).
O. umbrosa, Walker, xxxiii., p. 968.

Rangoon, July, 1888. In coll. Swinhoe.

430. *Passipeda hæmorrhoda.*

Calesia hæmorrhoda, Guén., Noct., iii., 258, 1683 (1852).
C. patna, Felder & R., Reise Nov. Lep., iv., pl. 117, f. 17 (1873).

Tavoy. In I. M., Calcutta.
Rangoon, October and November, 1888. In coll. Swinhoe.

431. *Macaldenia palumba.*

Hulodes palumba, Guén., Noct., iii., 211, 1613 (1852).
Remigia colligens, Walker, xxxiii., p. 1019 (1865).

Moulmein. In B. M.
Rangoon, July, 1888. In coll. Swinhoe.

432. *Calesia dasyptera.*

Erebus dasypterus, Kollar, Hüg. Kasch., iv., 476, 5 (1848).
E. leucostigma, Kollar, *l. c.*, No. 6.
Calesia comosa, Guén., Noct., iii., 258, 1682, pl. 21, f. 7 (1852).
C. stigmoleuca, Guén., *l. c.*, No. 1685.
Moulmein. In B. M.
Rangoon, October, 1888. In coll. Swinhoe.

433. *Calesia flabellifera.*

Calesia flabellifera, Moore, P. Z. S., 1878, p. 849.
(Type). Upper Tenasserim. In I. M., Calcutta.

434. *Calesia gastropachoides.*

Calesia gastropachoides, Guén., Noct., iii., 258, 1684 (1852).
Upper Tenasserim. In I. M., Calcutta.

435. *Hypætra noctuoides.*

Hypætra noctuoides, Guén., Noct., iii., 259, 1686 (1852).
Moulmein. In B. M.
Rangoon, September, 1888. In coll. Swinhoe.

436. *Hypætra occularia*, n. sp. (Pl. VIII., fig. 4).

Palpi deep black, last joint grey. Antennæ dark brown above, grey beneath. Head, thorax, and fore wings dark almond-brown. Fore wing with some pale grey flecks; costa with a pale grey point one-third from the base, and five towards the apex, extreme base suffused with grey; a large grey spot below the median vein one-fourth from base, another still larger just beyond the centre of the wing, indented on the upper inner side, ringed with black and grey, and with two large black spots inside, like a large ear-shaped ocellus; subbasal, medial, ante-medial, and submarginal brown sinuous thin transverse bands, more or less indistinct, the first running outside the first large grey spot, the third outside the ocellus, and almost meeting the second on the hinder margin of the wing, the second and third margined with greyish on their inner sides, and the fourth on the outer side; the whole outer space of the wing outside the third band more densely marked with grey flecks; marginal festoon brown with grey points. Hind

wings blackish brown, paler at the base; some grey flecks on the anal margin; cilia of both wings reddish brown with brown tips. Under side: wings uniform brown, with prominent veins; body and legs brown; fore tibiæ and tarsi greyish white, tibiæ speckled with brown and with a brown spot, tarsi banded with brown, middle third tarsi with white bands on the joints; abdomen with white spots on the sides. Expanse of wings, 2 in.

Bassein, August, 1888. In coll. Swinhoe.

Differs from the other species of this genus in having an ocellus-shaped mark on fore wings.

437. *Dordura aliena.*

Hypætra aliena, Walker, xxxiii., p. 964, ♀ (1865).
Dordura apicalis, Moore, Descr. Ind. Lep. Atk., ii., p. 170, pl. 5, f. 20, ♂ (1882).

Rangoon, June, 1888. In coll. Swinhoe.

Though the types of these two are very dissimilar, it is evident, from the examination of a series of this insect, that it is extremely variable, and that *apicalis* is nothing more than a handsomely marked male of *aliena*.

438. *Ophiusa arcuata.*

Ophiusa arcuata, Moore, P. Z. S., 1877, p. 609.
O. joviana, Guén. (nec Cram.), Noct., iii., 269, 1702 (1852).

Rangoon, July and October, 1888. In coll. Swinhoe.

439. *Ophiusa crameri.*

Dysgonia crameri, Moore, Lep. Ceylon, iii., p. 177, pl. 171, f. 2 (1885).
Phalæna (*Noctua*) *achatina*, Cram. (nec Sulzer), Pap. Exot., iii., pl. 288, f. A (1780).

Tavoy. In I. M., Calcutta.
Palone, August, 1887. In coll. Swinhoe.

440. *Ophiusa fulvotænia.*

Ophiusa fulvotænia, Guén., Noct., iii., 272, 1710 (1852).

Moulmein. In B. M.
Rangoon, July, 1888. In coll. Swinhoe.

441. *Ophiusa joviana.*

Phalæna (*Noctua*) *joviana*, Cram., Pap. Exot., iv., pl. 399, f. B (1782).
Noctua sinuata, Fabr., Mant. Ins., ii., 145, 83 (1787).
Ophiusa myops, Guén., Noct., iii., 265, 1693 (1852).

Moulmein. In B. M.
Rangoon, July and October, 1888. In coll. Swinhoe.

442. *Grammodes ammonia.*

Phalæna (*Noctua*) *ammonia*, Cram., Pap. Exot., iii., pl. 250, f. D (1779).

Rangoon, October and November, 1888. In coll. Swinhoe.

443. *Grammodes mygdon.*

Phalæna (*Noctua*) *mygdon*, Cram., Pap. Exot., ii., pl. 156, f. G (1777).

Moulmein. In B. M.
Rangoon, October, 1888. In coll. Swinhoe.

444. *Fodina stola.*

Fodina stola, Guén., Noct., iii., 275, 1715 (1852).

Moulmein. In B. M.
Tenasserim. In coll. Moore.

445. *Artena submira.*

Artena submira, Walker, xiv., p. 1389 (1858).

(Type). Moulmein. In B. M.
Rangoon, July, 1887. In coll. Swinhoe.

446. *Athyrma polyspila.*

Athyrma polyspila, Walker, xxxiii., p. 966 (1865).

Moulmein. In B. M.
Rangoon, August, 1888. In coll. Swinhoe.

447. *Athyrma semilugens.*

Hydrelia semilugens, Walker, xii., p. 814 (1857).
Baniana luteiceps, Walker, xxxiii., p. 1000 (1865).

(Types of *semilugens* and *luteiceps*). Moulmein. In B. M.

EUCLIDIDÆ.

448. *Trigonodes cephise.*

Phalæna cephise, Cram., Pap. Exot., iii., pl. 227, f. c (1779).

Moulmein. In B. M.
Rangoon, October, 1888. In coll. Swinhoe.

449. *Trigonodes hyppasia.*

Phalæna (*Noctua*) *hyppasia*, Cram., Pap. Exot., iii., pl. 250, f. c (1779).
Trigonodes compar, Walker, xiv., p. 1451 (1857).

Moulmein. In B. M.

450. *Trigonodes maxima.*

Trigonodes maxima, Guén., Noct., iii., 282, 1723 (1852).

Moulmein. In B. M.
Thyetmyo. In Phayre Museum, Rangoon.
Rangoon, October, 1888. In coll. Swinhoe.

REMIGIIDÆ.

451. *Cauninda archesia.*

Phalæna (*Noctua*) *archesia*, Cram., Pap. Exot., iii., pl. 273, figs. F, G (1780).
Remigia bifasciata, Walker, xxxiii., p. 1014 (1865).

Moulmein. In B. M.
Mergui and Tavoy. In I. M., Calcutta.

452. *Remigia frugalis.*

Noctua frugalis, Fabr., Ent. Syst., iii., 2, 138 (1794).
Chalciope lycopodia, Geyer, Hübn., Zütr. Exot. Schm., 25, 449, figs. 897—8 (1837).
Remigia translata, Walker, xxxiii., p. 1015 (1865).

Moulmein. In B. M.
Mergui. In I. M., Calcutta.
Rangoon, July, 1888. In coll. Swinhoe.

453. *Remigia quæsita.*

Remigia quæsita, Swinhoe, P. Z. S., 1885, p. 468, pl. 27, f. 8.

Thyetmyo, June, 1888. In Phayre Museum, Rangoon.
Rangoon, October, 1888. In coll. Swinhoe.

ARMANA, n. g.

♂. Body moderately stout. Abdomen lanceolate, short, not extending to the end of hind wings, and slightly tufted at the tip; palpi vertical, second joint long, densely pilose, tufted at the tip, the tuft nearly covering the third joint, which is lanceolate, about one-fourth the length of the second and depressed, giving the palpi the form of a hooked tip. Antennæ as long as the body, crenulated; legs rather long; femora and tibiæ with long hairs on all the legs; middle and hind tibiæ with long spurs. Fore wing narrow, costa nearly straight, outer margin moderately oblique and slightly rounded, hinder margin outwardly curved towards the base.

Separable at once from the genus *Remigia* by its clean long tarsi, and from that genus and the genus *Cauninda* by its peculiar-shaped palpi.

454. *Armana nigræricta*, n. sp. (Pl. VIII., fig. 1).

Palpi, face, and eyes deep black. Antennæ brown, their crenulations white; top of head, thorax, abdomen, and wings above of a uniform bright pale yellowish fawn-colour. Wings slightly irrorated with minute black atoms, which are denser on the outer half; two black spots on the cell-veins in the fore wings, one near the centre and the other towards the end of the cell, and one black spot on the cell-vein on the hind wings near the centre of the cell; a straight duplex brown band from the apex of the fore wings to the abdominal margin of hind wings, one-third from the anal angle, both wings outside this line shaded darker than the rest of the wings in consequence of the denser irrorations; a small blackish patch at the apex of fore wings on the outer side of the band, and two small black angles on the inner side, and a small black patch at the other end of the band towards the anal angle. Below yellower, irrorations on wings denser throughout, transverse band black, not duplex, fines down on hind wing, and terminates before reaching abdominal margin; a black spot in centre of each cell, and no black marks at either end of the band; fore and middle legs with blackish femora and tibiæ, and grey tarsi; hind legs with brown on the tarsi above. Expanse of wings, $1\frac{6}{10}$ in.

Bassein, August, 1888. In coll. Swinhoe.

PSEUDO-DELTOIDES.

FOCILLIDÆ.

455. *Zethes cristifera.*

Ephyrodes cristifera, Walker, xxxiii., p. 1071 (1865).
Catada epops, Felder & R., Reise Nov. Lep., pl. 120, f. 42, ♀ (1873).
Bassein, August, 1888. In Phayre Museum, Rangoon.

456. *Zethes decolor.*

Focilla? decolor, Walker, xxxiii., p. 1029 (1865).

Bassein, September, 1888; Bhamo, October, 1882; Rangoon, July, 1888. In coll. Swinhoe.

457. *Zethes hæsitans.*

Zethes hæsitans, Walker, xv., p. 1524 (1858).

(Type). Moulmein. In B. M.

458. *Zethes mopsa*, n. sp.

Fawn-colour, irrorated with greyish brown atoms. Fore wings with a white ear-shaped hyaline spot within the cell; four sinuous brown rather indistinct lines across both wings, outwardly curved on fore wings, nearly straight on hind wings; first basal, only apparent on fore wings, second before the hyaline spot, third and fourth beyond it, all nearly equidistant, the third thickening into a brownish band on the costa, and some indistinct thin sinuous lines between the transverse lines; a discal brown band, nearly straight, on both wings, immediately followed by a very fine indistinct sinuous line marked with whitish and blackish points and lunules, which on the fore wing run to the apex; marginal line brown; fringe brown, with a pale basal band. Expanse of wings, 1 in.

Rangoon, 1883. In coll. Swinhoe.

Differs from *Z.* (*Egnasia*) *inserpatalis*, Walker, in its smaller size, want of subapical whitish patch, and in the difference of the position of the transverse lines.

459. *Zethes compactilis*, n. sp. (Pl. VII., fig. 16).

Palpi, antennæ, and top of head reddish brown. Body and wings dark purplish grey. Abdomen with two reddish brown tufts at base, and a thin dorsal line of that colour, which thickens on to the anal tuft, which is brown at the tip and greyish white at the sides, as is

also the abdomen ; tegulæ covered with greyish white hairs. Fore wings entirely smeared with the same colour, and sparsely irrorated with brown atoms; a very large brown patch on the hinder margin just before the middle, a faint band above running past the small grey-ringed orbicular, an equally large brown patch at the hinder angle, pale in its interior ; in some lights both patches are almost invisible on account of the speckled grey sheen on them, a grey curved line running through the last patch; brown points close to the margin, which form a lunular line towards the angle; costal and outer and inner marginal lines pale brown towards the apex, three pale dots on costa near apex, cilia dark brown. Hind wing darker, not being suffused with grey; marginal line brown, lunular; cilia brown, with a basal pale line; abdominal border fringed with whitish hairs. Expanse of wings, $1\frac{4}{10}$ in.

Thyetmyo, November, 1887. In coll. Swinhoe.

Allied to *Zethes aristifera*, is smaller, differently coloured, has the two patches on the hinder border of fore wings, and differs altogether in general character.

460. *Zethes palliolata*, n. sp. (Pl. VIII., fig. 10).

Palpi brown, pale at the tips. Antennæ brown. Body and wings of a uniform luteous white, tinged with pale pinkish. Thorax with a thin brown line in front. Abdomen irrorated with grey; segments marked with brown and white. Wings sparsely irrorated with chocolate-red atoms, the irrorations denser in parts, forming bands and lines; reniform represented by a black spot, orbicular like a narrow ear, ringed with chocolate-red. Fore wing with a basal and two other equidistant outwardly curved lines within the basal third, which is dark from the denser irrorations, the outward line elbowed outwardly above and below, a duplex sinuous very short central line from the costa ; a duplex discal line straight from the abdominal margin of hind wing near the angle to the lower radial interspace on the fore wings, and from thence into three branches on to the costa; first bent acutely inwards, second and third circling above round a whitish large subapical spot, a sinuous line beyond this duplex line, from the elbow on the fore wing to the anal angle of the hind wing, which is darkest on the margin; there is also a darkish patch on the fore wing beyond the elbow ; submarginal points and marginal festoon brown ; a brown point near end of cell on hind wing. Expanse of wings, $1\frac{4}{10}$ in.

Rangoon. July, 1888. In coll. Swinhoe.

Allied to *Zethes decolor*, Walker ; somewhat similarly

marked, differs in colour, in the angulated nature of the inner bands, in the great difference in shape of the orbicular stigma, and absence of spot at anal angle.

461. *Zethes umbrifera*, n. sp.

Body purplish brown. Wings with the ground colour yellowish grey, but so covered with purplish brown shades as to be almost altogether of that colour, with the ground colour showing here and there. Fore wing with a large black spot below the costa one-fourth from the base, and another small one on a light ground beyond it; a brown line from the costa beyond the middle, forming a sharp outward angle, then sinuous downwards to the hinder margin beyond the middle; a corresponding semidentated brown band on hind wings, running straight across the wing to the abdominal margin near the anal angle, the latter outwardly pale-edged, as also is a submarginal similar band across both wings, well separated from the margin; a very large blackish spot or patch, rounded below, on the costa of fore wings near the apex, where there are five pale points; veins prominent; marginal points black, line brown; fringe variegated. Expanse of wings, $1\frac{4}{10}$ in.

Rangoon, November, 1888. In coll. Swinhoe.

Easily distinguishable from the other species by its sombre colour, and the black spot of raised scales below the costa near the base of the fore wings.

462. *Zethes exigualis*, n. sp. (Pl. VII., fig. 8).

Chocolate-brown; palpi blackish brown. Fore wings with three blackish spots or patches on the basal half, a broad white central band, striated with chocolate-brown on the lower half, and becomes suffused into the general colour of the wing upwards before reaching the costa, its outer border bends outwards into an acute angle in its centre, the upper part of the angle being limited by a white streak from the apex of the angle to the middle of the costa on the last blackish spot; a pale transverse subapical line runs half-way down the wing, with a blackish diffused space on its inner side, and a subcostal blackish streak from this patch to the base of the wing; a submarginal row of pale points. Hind wings with a central band, corresponding to the band on the fore wings, but attenuated hindwards; some indistinct subbasal pale points and fringe on both wings with a pale basal line. Expanse of wings, $\frac{6}{10}$ in.

Rangoon, 1887. In coll. Swinhoe.

Not resembling any species known to me ; looks like a small *Pyrale*.

463. *Rhæsena obliquifasciata*.

Rhæsena obliquifasciata, Moore, Descr. Ind. Lep. Atk., ii., p. 183 (1882).

Rangoon, November, 1888. In coll. Swinhoe.

464. *Rhæsena transcissa*.

Rhæsena transcissa, Walker, xxxv., p. 1974 (1866).

Rangoon, July, 1888. In coll. Swinhoe.

Walker's type came from Australia, but my insect is identical with it, and Mr. Moore has it from Ceylon.

465. *Cultripalpa indistincta*.

Cultripalpa indistincta, Moore, Descr. Ind. Lep. Atk., ii., p. 183 (1882).

Bassein, August, 1888. In Phayre Museum, Rangoon.

466. *Cultripalpa partita*.

Cultripalpa partita, Guén., Noct., iii., 332, 1797 (1852).

Bassein. In Phayre Museum, Rangoon.

467. *Egnasia ephyrodalis*.

Egnasia ephyrodalis, Walker, xvi., p. 217 (1858).

Rangoon, November, 1888. In coll. Swinhoe.

468. *Egnasia reduplicalis*.

Egnasia? reduplicalis, Walker, xxxiv., p. 1179 (1865).

(Type). Moulmein. In B. M.

Rangoon, 1883, 1887; Bassein, August, 1888. In coll. Swinhoe.

469. *Egnasia talusalis*.

Egnasia talusalis, Walker, xvi., p. 219 (1858).

(Type). Moulmein. In B. M.

470. *Egnasia ignecla*, n. sp.

Chocolate-colour. Body and both wings irrorated with white. Abdomen also with white flecks down each side. Fore wings with a pale yellowish spot for the orbicular; reniform bright igneous

yellow, transverse, with a small connected dot in front, and a short streak behind, a subbasal indistinct disconnected chocolate transverse band, another similarly coloured more distinct band just beyond, bent outwardly to and disconnected at the reniform, two others beyond the orbicular, one bent just outside it, where there is a large suffused dark chocolate space, the outer line white above, and deeply bent in on to the costa almost above the orbicular; a submarginal white line denticulated above, limiting the flaming subcostal patch, and sinuous below, the space between this and the inner band being more or less suffused with igneous yellow; another indistinct white and brown line close to the margin. Hind wings pale on the costal portion, a brown lunule at end of cell, a brown recurved line corresponding to the third line on the fore wings, a white recurved line corresponding to the fourth, edged on both sides with brown, followed by a yellowish band; the rest of the wing dark chocolate, with the submarginal white line and line close to the margin like those on the fore wing; cilia on both wings dark chocolate, interlined. Expanse of wings, $1\frac{2}{10}$ in.

Rangoon, August, 1886 and 1888. In coll. Swinhoe.

Differs from all other *Egnasia* in its oblique white subapical line on fore wings, the fiery-red mark at end of cell, and straight red-bordered black discal line on hind wing.

471. *Nagadeba ianthina*, n. sp.

Brownish purple; palpi white speckled with brown. Body and wings irrorated with greyish white atoms, a prominent white spot for the orbicular, reniform pale, indistinct; costal space towards apex smeared with white; both wings crossed by a white line, margined with brown on its inner side, which commences on the costa near the middle, runs straight towards the outer margin, forms an angle outside the reniform, and is slightly sinuous from thence to the abdominal margin of hind wing near anal angle; between this line and the base are several indistinct transverse brownish bands, and between this line and the outer margin is an indistinct sinuous whitish line, dentated in parts, and also margined inwardly with brown; cilia brown, with a fiery red basal band. Expanse of wings, $\frac{9}{10}$ in.

Rangoon, July, 1888. In coll. Swinhoe.

Has the white oblique subapical streak and bands disposed somewhat as in *Egnasia igneola*.

472. *Matella sinuosa.*

Egnasia sinuosa, Moore, Descr. Ind. Lep. Atk., ii., p. 184 (1882).

Moulmein. In coll. Moore.

473. *Daxata multifasciata*, n. sp. (Pl. VII., fig. 14).

Blackish brown, tinged with pinkish; palpi pinkish grey, marked with brown. Antennæ and body blackish brown; ground colour of wings pinkish grey, thickly suffused with blackish brown, and both wings crossed by many suffused fasciæ; a large black mark at the end of cell; costa with several black marks; a black subbasal band on fore wings, an outwardly curved dentated central black line across both wings; black marginal lunular spots and a mixed cilia of brown and pale pinkish. Under side paler, veins and intermediate lines prominent, both wings with three outwardly curved dark bands, and spot at end of cell of fore wings. Expanse of wings, $\frac{8}{10}$ in.

Rangoon, June, 1888. In coll. Swinhoe.

Allied to *D. bijungens*, Walker; differs in the disposal of the bands and the outwardly curved dentated central black line.

AMPHIGONIDÆ.

474. *Lacera alope.*

Phalæna (*Noctua*) *alope*, Cram., Pap. Exot., iii., pl. 286, figs. E, F (1780).

Lacera capella, Guén., Noct., iii., 337, 1802, pl. 24, f. 13 (1852).

Moulmein. In B. M.

Rangoon, July, 1888. In coll. Swinhoe.

475. *Amphigonia hepatizans.*

Amphigonia hepatizans, Guén., Noct., iii., 338, 1805, pl. 24, f. 12 (1852).

Moulmein. In B. M.

Rangoon, July, 1888. In coll. Swinhoe.

THERMESIIDÆ.

476. *Platyja lobifera.*

Platyja lobifera, Moore, Journ. As. Soc. Beng., pt. 2, p. 101 (1886).

Tavoy. In I. M., Calcutta.

477. *Platyja umminia.*

Phalæna (*Noctua*) *umminia*, Cram., Pap. Exot., iii., pl. 267, f. F (1780).
Sympis subunita, Guén., Noct., iii., 344, 1810 (1852).
Cotuza drepanoides, Walker, xv., p. 1552 (1858).
Ginœa removens, Walker, xv., p. 1638.
Ophisma trajecta, Walker, Char. Undescr. Lep. Het., p. 108 (1869).
Hulodes falcata, Felder & R., Reise Nov. Lep., pl. 115, f. 8, ♂ (1873).

(Type, *drepanoides*). Moulmein. In B. M.
Rangoon, July and October, 1888. In coll. Swinhoe.

478. *Sympis rufibasis.*

Sympis rufibasis, Guén., Noct., iii., 344, 1809, pl. 24, f. 1 (1852).

Moulmein. In B. M.
Rangoon, June, 1888. In coll. Swinhoe.

479. *Capnodes finipalpis.*

Thermesia finipalpis, Walker, xv., p. 1576, ♀ (1858).
Capnodes maculicosta, Walker, xv., p. 1608.

Thyetmyo, September, 1887. In coll. Swinhoe.

480. *Capnodes fabularis*, n. sp.

Olive-brown, irrorated with minute grey atoms; a black basal spot on costa and indication of a pale line; an ante-medial erect yellowish grey line on fore wing, sinuous above, and bent in on to the costa, where there is a deep black spot; another black spot in the centre above the long black-yellow linear orbicular mark, two or three yellowish dots towards the apex, where there is a yellowish suffusion, which in some specimens runs down the outer border; a yellowish grey nearly straight line from a small brown patch on the costa, one-fourth from the apex to the abdominal margin of hind wings beyond the middle; an indistinct sinuous yellowish line between this and the margin on the fore wings, invisible in most specimens on hind wing; marginal points black, marked with pale yellowish outside. Expanse of wings, 1 in.

Rangoon, August, September, and October, 1888. In coll. Swinhoe.

There is an example of this insect in the British Museum from North China.

Much smaller than *C. maculicosta;* differs in its brown coloration, and in the two transverse pale lines on fore wing and medial line on hind wing.

481. *Thermesia simplex.*

Thermesia simplex, Walker, xxxiii., p. 1063 (1865).
(Type). Moulmein. In B. M.

482. *Thermesia subcostalis.*

Thermesia subcostalis, Walker, xxxiii., p. 1059 (1865).
(Type). Moulmein. In B. M.

483. *Sanys rivulosa.*

Thermesia rivulosa, Walker, xxxiii., p. 1060 (1865).
(Type). Moulmein. In B. M.

484. *Selenis longipalpis.*

Selenis longipalpis, Walker, xxxiii., p. 1068 (1865).
(Type). Moulmein. In B. M.

485. *Mestleta irrecta.*

Selenis irrecta, Walker, xxxiii., p. 1066 (1865).
S. niviapex, Walker, xxxiii., p. 1069.

Moulmein. In B. M.
Rangoon, October, 1888. In coll. Swinhoe.

486. *Sonagara scitaria.*

Drepanodes ? scitaria, Walker, xxvi., p. 1488 (1862).
Anisodes ? pyriniata, Walker, xxvi., p. 1582.
Thermesia ? reticulata, Walker, xxxiii., p. 1062 (1865).
Homodes thermesioides, Snellen, Tijd. Voor. Ent., xx., p. 28, pl. 2, f. 15 (1877).

Mergui. In I. M., Calcutta.
Rangoon. In Phayre Museum, Rangoon.

487. *Azazia rubricans.*

Ophiusa rubricans, Boisd., Faun. Lep. Mad., p. 106, pl. 16, f. 1 (1834).
Thermesia transducta, Walker, xxxiii., p. 1058 (1865).
T. consueta, Walker, Char. Undescr. Lep. Het., p. 93 (1869).

Rangoon, October and November, 1888. In coll. Swinhoe.

488. *Pleurona falcata.*

Pleurona falcata, Walker, xxxv., p. 1564 (1866).
Rangoon, August, 1888. In coll. Swinhoe.

DELTOIDES.

PLATYDIDÆ.

489. *Episparis varialis.*

Neviasca varialis, Walker, xvi., p. 7 (1858).
Episparis signata, Walker, xxxiii., p. 1032 (1865).
E. davallia, Felder & R., Reise Nov. Lep., pl. 120, f. 41 (1873).

Rangoon, April and July, 1888. In coll. Swinhoe.

HYPENIDÆ.

490. *Dichromia orosia.*

Phalæna (*Noctua*) *orosia*, Cram., Pap. Exot., iii., pl. 275, f. D (1780).

Rangoon, November, 1888. In coll. Swinhoe.

491. *Dichromia quadralis.*

Dichromia quadralis, Walker, xvi., p. 14 (1858).

Rangoon, September, 1888. In coll. Swinhoe.

492. *Hypena biplagiata.*

Hypena biplagiata, Butler, Ill. Typ. Lep. Het. B. M., vii., p. 86, pl. 134, f. 1 (1889).

Rangoon, October, 1888. In coll. Swinhoe.

493. *Hypena cidarioides.*

Hypena cidarioides, Moore, Descr. Ind. Lep. Atk., ii., p. 189 (1882).

Rangoon, November, 1888. In coll. Swinhoe.

494. *Hypena laceratalis.*

Hypena laceratalis, Walker, xvi., p. 60 (1858).

Rangoon, October, 1888. In coll. Swinhoe.

495. *Hypena læsalis.*

Hypena læsalis, Walker, xvi., p. 62 (1858).

(Type). Moulmein. In B. M.

496. *Hypena mandatalis.*

Hypena mandatalis, Walker, xvi., p. 58 (1858).

Rangoon, August, 1888. In Phayre Museum, Rangoon.

497. *Hypena invenustalis*, n. sp.

Brownish fawn-colour; palpi long, two-thirds of length of abdomen, black at the sides, last joint short, one-fourth of the length of second. Fore wing with a black spot in centre of cell, a brown line curving outwards slightly from beyond centre of hinder margin to costa, less than one-third from apex, and margined with whitish on its outer side, followed by a line of black points. Hind wings unmarked; marginal line on both wings black, lunular, margined inwardly with whitish; cilia brown. Under side greyish brown, unmarked; outer veins and intermediate lines prominent. Expanse of wings, 1 in.

Rangoon, July and August, 1888. In coll. Swinhoe.

Allied to *H. obstupidalis*, Swinhoe; the palpi are longer, inner and outer lines wanting, central line inclining outwards, and not erect as in that species.

498. *Nolasena ferrifervens.*

Nolasena ferrifervens, Walker, xii., p. 982 (1857).

Rangoon, October, 1888. In coll. Swinhoe.

499. *Marapana raralis.*

Hypena raralis, Walker, xvi., p. 65 (1858).

Rangoon, October, 1888. In coll. Swinhoe.

500. *Ophiuche mistacalis.*

Herminia mistacalis, Guén., Delt. et. Pyral., 60, 69 (1854).

Mergui. In I. M., Calcutta.

501. *Ophiuche quinquelinealis.*

Hypena quinquelinealis, Moore, P. Z. S., 1877, p. 612.

Rangoon, September and October, 1888. In coll. Swinhoe.

HERMINIIDÆ.

502. *Dragana pansalis.*

Dragana pansalis, Walker, xvi., p. 200 (1858).
Apphadana evulsalis, Walker, xxxiv., p. 1213 (1865).
Poaphila concors, Walker, xxxv., p. 1969 (1866).

Mergui. In I. M., Calcutta.
Rangoon, July, 1888. In coll. Swinhoe.

503. *Apphadana rubicundula.*

Apphadana rubicundula, Swinhoe, P. Z. S., 1885, p. 475, pl. 28, f. 2.

Rangoon, October, 1888. In coll. Swinhoe.

504. *Apphadana plana*, n. sp.

Brownish fawn-colour; orbicular represented by a black spot, reniform obsolete. Fore wing crossed by three brownish sinuous very indistinct lines, first crossing outside the orbicular, second medial, third from hinder margin, one-third from the angle to the apex, and pale-edged outwardly. Hind wing with a brown spot at end of cell, and a discal sinuous brown line corresponding to the outer line of the fore wing, the space beyond this line on both wings being brownish and darker than the rest of the wings. Expanse of wings, $\frac{8}{10}$ in.

Bassein, August, 1888. In coll. Swinhoe.

Allied to *A. festina*, Swinhoe; differs in its lighter coloration, its black orbicular spot, and the shape and direction of the lines, the outer line of *festina* being uniform in its distance from the outer margin throughout, and touches the costa one-fourth from apex.

505. *Pseudoglossa modesta*, n. sp.

♂ ♀. Purple-brown. Antennæ of the male moderately pectinated on one side for two-thirds its length; orbicular represented by a pale dot; reniform large, ringed with ochreous grey, in shape like a crooked figure of eight; both wings crossed by three nearly

equidistant outwardly curved sinuous black lines, the first margined inwardly, the other two outwardly, with pinkish white, ante-medial, medial, and post-medial, and rather close together; a fourth line, submarginal and of the same description on the fore wing only, and which terminates near the apex in a pure white prominent spot on a black ground, sometimes with a very small pure white dot just above it. Under side paler, bands on hind wing as above, and a discal band in addition on fore wing; a longitudinal spot for the orbicular, and a large round spot for the reniform, both encircled with white; apical spot as above, and a black lunular mark at the end of cell on hind wing; all the bands and marks very black and prominent; body black; legs black, streaked in some specimens with pale pinkish white, and spurs black. Expanse of wings, ♂ $1\frac{1}{10}$, ♀ $1\frac{4}{10}$ in.

Rangoon, July, 1888. In coll. Swinhoe.

I have this also from Bombay and the Nilgiris.

Allied to *P. fulvipicta*, Butler, Ill. Typ. Lep. Het. B. M., vii., p. 87, pl. 134, f. 7 (1889); bands and stigmata differently shaped.

506. *Bertula imperatalis.*

Bertula imperatalis, Walker, xxxiv., p. 1168 (1865).

(Type). Moulmein. In B. M.

507. *Bertula agrestis*, n. sp.

Purplish brown. Body and wings for two-thirds their length faintly dusted with grey. Fore wings crossed with three equidistant sinuous brown lines, ante-medial, medial, and post-medial, and rather close together, on hind wings; these lines converge on the abdominal border towards the anal angle, the third being lost in the broadly diffused discal band, which crosses both wings, and has a reddish tinge, and on the outside of this band is an indistinct pale sinuous line; marginal line black and lunular, a yellowish patch at the anal angle of the hind wings. Wings below brown, paling on the inner borders; veins and lines between them prominent; three transverse sinuous lines as above, with an indication of a fourth. Expanse of wings, $1\frac{4}{10}$ in.

Rangoon, July, 1888. In coll. Swinhoe.

I have this insect also from North Kanara.

Allied to *Bertula placida*, Moore; wings much shorter, outer line bent instead of being nearly straight, and differs in having the broadly diffused discal band.

508. *Bertula ethnica*, n. sp. (Pl. VIII., fig. 11).

Blackish brown; insides and tips of palpi pale greyish. Abdomen greyish brown, with greyish at base and on segments. Wings of a uniform blackish brown; a lunular mark at end of cell of fore wings, a transverse blackish sinuous line across both wings just before the middle, a black band from the hinder margin one-third from anal angle to the costa near the apex, followed by some pale marks, and the rest of the wings beyond nearly as dark as the band; marginal festoon black; cilia blackish brown. Under side uniformly brown; wings paling towards the base; veins and streaks between them prominent; tarsi and spurs with pale bands. Expanse of wings, $1\frac{4}{10}$ in.

Rangoon, July, 1888. In coll. Swinhoe.

Allied to *B. agrestis*, but differently marked across the wings.

509. *Bertula factitia*, n. sp.

Of a uniform dark olive-brown. Fore wing with a black dot in centre of cell, a black ringlet at the end, a short black sinuous line commencing at costa near the base, another one-third from base, which in some specimens is only indicated on the costa, in others crosses the wing; a third discal, more or less dentated across both wings, and bends in on costa of fore wing; a submarginal dentated pale line, which is not always visible on the hind wing; marginal line black, slightly lunular; cilia with a pale line at the base. Under side paler; veins and intermediate lines prominent; a black dot at end of cell in all the wings, a discal transverse dentated line across both wings, and another blackish similar line between this and outer margin, clearest on hind wings; marginal line and cilia as above. Expanse of wings, $1\frac{2}{10}$ in.

Bassein, August, 1888. In coll. Swinhoe.

I have this also from Calcutta.

Differs from the two former, from which it can easily be distinguished by the discal dentated transverse line.

510. *Bertula analis*, n. sp. (Pl. VIII., fig. 5).

Blackish brown; insides and tips of last two joints of palpi pale flesh-colour. Thorax with some dark grey hairs at the base. Fore wings flecked with pale pinkish grey, especially so on the basal and costal portions; an ear-shaped black ringlet at end of cell, with pale interior; costa with four small black patches, and with a larger black subapical patch edged with pale flesh-colour, some

very indistinct and incomplete blackish pale-bordered sinuous lines across the wing from the patches, only visible here and there, a row of pale points below the large subapical patch; marginal lunules black; cilia pale at the base. Hind wings with an indistinct dentated medial outwardly curved irregular line, with pale marks; another similar pale flesh-coloured discal line, attached to a deep black streak on the abdominal margin near the anal angle; marginal line and fringe as in fore wing, a pale lunular mark at end of cell; costa and base paler than rest of wing. Under side paler; costa of fore wings broadly flesh-colour in its central parts, with two black spots; a pale lunule at end of cell in both wings; hind wing with a central sinuous blackish line running past the lunule; both wings with a dentated discal blackish line, followed by another similar flesh-coloured line, margined inwardly with black; marginal line and cilia as above; outer veins prominent. Expanse of wings, $1\frac{1}{2}$ in.

Rangoon, October and November, 1888. In coll. Swinhoe.

Fore wings narrower than in the former species, and remarkable for its deep black subapical patch on fore wings, and anal streak on hind wings.

511. *Hipoepa? opacaria*, n. sp. (Pl. VIII., fig. 3).

Palpi, antennæ, head, thorax, and fore wings pinkish brown, glossed and shining. Abdomen grey; basal hairs white. Fore wings with several shades of colour; a straight outwardly inclined ante-medial dark line, a slightly sinuous post-medial line, between them a dark shaded band, which elbows outwardly in two places, and a submarginal sinuous line, dentated outwardly in places. Hind wings pale pinkish brown, whitish towards the base; marginal line on both wings brown; fringe interlined. Expanse of wings, $1\frac{4}{10}$ in.

Rangoon, January, 1887. In coll. Swinhoe.

Not allied to any species I know of.

512. *Hadennia ignicoma*, n. sp. (Pl. VIII., fig. 12).

Purplish brown; a long tuft of red hairs at the tip of palpi, rising like a crest above the head; reniform represented by a prominent latitudinal white spot pointed at both ends; a black suffused broad band just before the middle across both wings, another similar broader discal band, broadly suffused towards apex of fore wing and in disc of hind wing. Under side pale greyish

brown, greyish on basal half of costa of fore wings, and nearly the whole surface of hind wings, with the white spot on fore wing prominent, as also are the outer veins and intermediate lines. Expanse of wings, $1\frac{2}{10}$ in.

Rangoon, June, 1888. In coll. Swinhoe.

Differs from *H. hypenalis*, Walker, in the absence of the sinuous central transverse brown line on fore wing and yellowish discal line on both wings, and from *H. prunosa* in having the outer band on fore wing above less oblique, in the absence of marginal white dots, and on the under side the submarginal white dentated line across both wings, and also the marginal white dots.

513. *Bocana manifestalis.*

Bocana manifestalis, Walker, xvi., p. 171, ♀ (1858).
Lamura oberratalis, Walker, xvi., p. 189, ♂.

Rangoon, June, 1886; August and October, 1888. In coll. Swinhoe.

514. *Bocana marginata.*

Bocana marginata, Moore, Descr. Ind. Lep. Atk., ii., p. 195, pl. 6, f. 19 (1882).

Rangoon, July, 1888. In coll. Swinhoe.

515. *Bocana nigella*, n. sp.

Dark blackish brown; sides of second joint of palpi deep black with pale interior and tips of last two joints. Eyes with pale lines on the inside. Fore wings with two black spots, one above the other, at the end of the cell, with indications of a pale ring round each; some pale indistinct points in a discal line across both wings, but very indistinct; marginal black spots and dark cilia with a pale line at its base. Under side paler, flecked with grey; veins and intermediate lines prominent, a pale black lunular mark at end of each cell; dentated, prominent, ante-medial and outer lines across both wings black, margined with white on their outer sides, the inner one indistinct on fore wings, a whitish spot on costa of fore wings one-fourth from apex, a smaller spot near the apex. Expanse of wings, $1\frac{3}{10}$ in.

Rangoon, June and September, 1888. In coll. Swinhoe.

Mr. Moore has this insect from the Andamans.

Differs from *B. manifestalis*, Walker, in its smaller size, narrower and more pointed fore wings, and in the

absence of the black reniform and discal transverse sinuous lines.

516. *Dyrzela bosca*, n. sp.

Olive-brown, irrorated with very minute greyish atoms. Fore wings with an indistinct brown lunular mark at end of cell; two indistinct transverse sinuous brown lines, first from hinder margin before the middle to the costa at one-third from base, second post-medial, erect, distorted above, and turns inwards on to the costa, a large black spot near the apex just outside this line; marginal points black; cilia brown. Hind wings unmarked, pale towards costa; veins prominent; cilia brown, with a pale basal line. Expanse of wings, $1\frac{3}{10}$ in.

Bassein, August, 1888.
Rangoon, September, 1886.
Bhamo, October, 1882. In coll. Swinhoe.

Allied to *D. incrassata*, Walker, from Borneo; is olive-brown instead of ferruginous, and has only two instead of three transverse lines on fore wings, and these are differently placed.

517. *Oglasa costipannosa*, n. sp.

Chocolate-brown. Thorax and fore wings smeared with greyish white powder; collar white in front and on the base of fore wings; costa pale to the patch, with a subbasal brown spot, and another below it; a sinuous indistinct brown line from the basal third to the centre of hinder margin, another more indistinct of a similar nature commencing just before the patch, which is very large, dark chocolate-brown, extends from centre of costa to near the apex, and extends nearly half-way downwards, is bordered with white, and irregularly curved and notched on its outer side; a discal line of transverse black spots below its centre, a whitish transverse line also across the wing below its outer end, commencing at the notched point; marginal line yellowish, points black. Hind wings paler, darkest towards apical portions; cilia of both wings pinkish brown, with pale tips on the hind wings. Expanse of wings, $1\frac{1}{10}$ in.

Rangoon and Moulmein, May, 1888.
Bhamo, October, 1882. In coll. Swinhoe.

Allied to *O. lagusalis*, Walker, from Borneo, is chocolate-brown instead of whitish testaceous, and has only one large rounded costal patch instead of two triangular ones.

518. *Hydrillodes lentalis.*

Hydrillodes lentalis, Guén., Delt. et Pyral., 66, 81, pl. 5, f. 3 (1854).
Catada ? captiosalis, Walker, xvi., p. 210 (1858).
Bleptina morosa, Butler, Ill. Typ. Lep. Het. B. M., iii., p. 64, pl. 56, f. 15 (1879).

Rangoon, June, 1888. In Phayre Museum, Rangoon.

519. *Nodaria externalis.*

Nodaria externalis, Guén., Delt. et Pyral., 64, 78 (1854).

Rangoon, July, 1888. In Phayre Museum, Rangoon.

520. *Avitta cervina.*

Briarda cervina, Walker, xxxv., p. 1968 (1866).

Rangoon, June, 1888. In Phayre Museum, Rangoon.

521. *Labanda fasciata.*

Lazanda (sic) *fasciata*, Walker, xxxii., p. 605 (1865).
Diomea muscosa, Walker, xxxiii., p. 898 (1865).
Labanda saturalis, Walker, xxxiv., p. 1251 (♂ only), (1865).

(Type, *fasciata*). Moulmein. In B. M.

522. *Aginna robustalis.*

Herminia robustalis, Guén., Delt. et Pyral., 58, 66 (1854).
Bocana turpatalis, Walker, xvi., p. 174 (1858).

Rangoon, July, 1888. In coll. Swinhoe.

523. *Rivula bioculalis.*

Rivula bioculalis, Moore, P. Z. S., 1877, p. 614.

Rangoon, September and October, 1888. In coll. Swinhoe.

524. *Spadix vegetus.*

Spadix vegetus, Swinhoe, P. Z. S., 1885, p. 475, pl. 28, f. 14.

Rangoon, August, 1888. In coll. Swinhoe.

525. *Zanclognatha invenustua*, n. sp. (Pl. VIII., fig. 9).

Palpi brown. Antennæ, body, and wings reddish fawn-colour; bands brownish, transverse, a short subbasal band from the costa, three equidistant, sinuous, ante-medial, medial, and post-medial, and rather close together, the third band marked with white at its outer side above, also a submarginal sinuous band, well-separated from the outer margin, and marked with whitish on its outer side throughout. Hind wings paler, with a whitish sinuous submarginal band corresponding to the above; brown marginal lunules on fore wing, a brown marginal line on hind wings; cilia with a pale basal line. Expanse of wings, $\frac{9}{10}$ in.

Rangoon. In coll. Swinhoe.

Allied to *Z. undulata*, Moore; pattern of markings somewhat similar, but is smaller, differs in the shape of the wings, thin reddish coloration, and in the general character of the insect.

PYRALES.

HAPALIADÆ.

526. *Dadessa elycesalis.*

Botys elycesalis, Walker, xix., p. 995 (1859).

(Type). Moulmein. In B. M.

527. *Conogethes punctiferalis.*

Astura punctiferalis, Guén., Delt. et Pyral., 320, 347 (1854).

Rangoon, October, 1888. In coll. Swinhoe.

528. *Botyodes asialis.*

Botyodes asialis, Guén., Delt. et Pyral., 321, 348, ♀ (1854).

Botys sellalis, Walker (nec Guén.), xviii., p. 648 (1859).

Botyodes sirionanthe, Meyrick, Trans. Ent. Soc. Lond., 1886, p. 262.

B. principalis, Leech, Entom., xxii., p. 69, pl. 3, f. 9 (1889).

Moulmein. In B. M.

Rangoon, October, 1888. In coll. Swinhoe.

529. *Botyodes scinisalis.*

Botys scinisalis, Walker, xviii., p. 648 (1859).
B. consimilalis, Lederer, Wien. Ent. Mon., vii., pp. 374, 471 (1863).
B. disjunctalis, Walker, Char. Undescr. Lep. Het., p. 96 (1869).

(Type). Moulmein. In B. M.
Rangoon, July, 1886; October, 1888. In coll. Swinhoe.

530. *Meroctena tullalis.*

Botys tullalis, Walker, xviii., p. 649 (1859).
Meroctena staintoni, Lederer, Wien. Ent. Mon., vii., p. 392, pl. 13, f. 4, ♂ (1863).

Moulmein, June, 1888. In Phayre Museum, Rangoon.
Rangoon, October, 1888. In coll. Swinhoe.

531. *Charema unitalis.*

Botys unitalis, Guén., Delt. et Pyral., 349, 411 (1854).
B. megapteralis, Walker, xxxiv., p. 1407 (1865).

Tenasserim. In I. M., Calcutta.

532. *Charema vinaccalis.*

Botys vinaccalis, Moore, P. Z. S., 1877, p. 619.

Tenasserim. In coll. Moore.

533. *Hapalia coclesalis.*

Botys coclesalis, Walker, xviii., p. 701 (1859).

Rangoon, September and October, 1888. In coll. Swinhoe.

534. *Hapalia caldusalis.*

Botys caldusalis, Walker, xviii., p. 650 (1859).

Tenasserim. In I. M., Calcutta.

535. *Hapalia damoalis.*

Botys damoalis, Walker, xviii., p. 656 (1859).

Rangoon, September, 1888. In coll. Swinhoe.

536. *Hapalia euryclealis.*

Botys euryclealis, Walker, xviii., p. 651 (1859).

(Type). Moulmein. In B. M.

537. *Hapalia ilusalis.*

Botys ilusalis, Walker, xviii., p. 705 (1859).

Rangoon, May, 1888. In coll. Swinhoe.

538. *Hapalia plagiferalis.*

Botys plagiferalis, Walker, xxxiv., p. 1452 (1865).

Rangoon, October, 1882; June, July, and August, 1888. In coll. Swinhoe.

539. *Hapalia ablactalis.*

Botys ablactalis, Walker, xviii., p. 660 (1859).

Rangoon, October, 1888. In coll. Swinhoe.

540. *Hapalia denticulosa.*

Hapalia? denticulosa, Moore, Lep. Ceylon, iii., p. 337, pl. 183, f. 8 (1886).

Rangoon, August, 1888. In coll. Swinhoe.

541. *Hapalia fraterna.*

Hapalia fraterna, Moore, Lep. Ceylon, iii., p. 338, pl. 183, f. 9 (1886).

Rangoon, September and November, 1888. In coll. Swinhoe.

542. *Hapalia iopasalis.*

Botys iopasalis, Walker, xviii., p. 652, ♂ (1859).
B. boteralis, Walker, xviii., p. 716.

(Type, *iopasalis*). Moulmein. In B. M.
Rangoon, May, 1886; August, 1888. In coll. Swinhoe.

Walker's labels of his *Botys iopasalis* and his *Botys plagiatalis* have, I think, got transposed in the B. M. Collection; they are insects closely allied and somewhat similarly marked; the latter is, however, nearly twice the size of the former, and the type is lost with Layard's collection. His descriptions of the insects

ought to be sufficient to prove that the labels in the B. M. have become wrongly placed. Both his types were females, *iopasalis* from Moulmein and *plagiatalis* from Ceylon, and his catalogue does not record any specimen of *plagiatalis* from any other locality.

543. *Hapalia ultimalis.*

Botys ultimalis, Walker, xviii., p. 659 (1859).

Rangoon, August, 1888. In coll. Swinhoe.

544. *Hapalia vitellinalis.*

Botys vitellinalis, Kollar, Hüg. Kasch., p. 492 (1848).
B. extinctalis, Lederer, Wien. Ent. Mon., vii., p. 467, pl. 9, f. 18 (1863).

Rangoon, October, 1888. In coll. Swinhoe.

545. *Hapalia ? mineusalis.*

Zebronia ? mineusalis, Walker, xvii., p. 481 (1859).

(Type). Moulmein. In B. M.
Rangoon, June, 1886. In coll. Swinhoe.

546. *Hapalia ? albicostalis*, n. sp.

Pale ochreous; sides of palpi and sides of collar pale reddish ochreous; top of head whitish; costal line of fore wings white, costal portion above subcostal vein and outer portions of the wing slightly darker than the rest of the wing, a greyish ochreous lunule at end of cell, lines of same colour, very indistinct, sinuous, one ante-medial, almost invisible, another discal, outwardly curved above. Hind wings paler than fore wings, unmarked; cilia greyish ochreous, interlined. Abdomen white. Under side, body, and legs white; wings of a uniform pale greyish ochreous; fore wings with the lunule at end of cell, costal space, and apical margin suffused with brown. Expanse of wings, 1 in.

Rangoon, August, 1888. In coll. Swinhoe.

Belongs to Mr. Warren's new genus *Aploprepes*, MS. ined., and is allied to nothing I know of.

547. *Hapalia cascalis*, n. sp. (Pl. VIII., fig. 18).

Pale ochreous brown; top of head pale yellowish. Fore wings with the outer veinlets prominent, apex rather acute; a grey

lunule at end of cell; two greyish sinuous lines, first ante-medial, almost erect, second discal, curving outwards above. Hind wings with the costal space whitish towards the base, a grey transverse discal line corresponding to the discal line above; cilia dark brown, interlined. Under side: Body white, shining; legs brownish, tarsi white. Expanse of wings, 1 in.

Rangoon, August, 1886. In coll. Swinhoe.

548. *Hapalia perbonalis*, n. sp. (Pl. VIII., fig. 17).

Reddish ochreous; costa of fore wings marked with brown spots along its whole length; a brown misshapen ringlet with pale centre at end of cell; both wings crossed by thin greyish ochreous nearly straight slightly sinuous bands, first ante-medial, second post-medial, meeting together on the abdominal margin near anal angle, third discal on fore wing only, fourth and fifth submarginal and close together, the fifth being marked by largish spots of same colour on the veins; fringe grey, interlined. Expanse of wings, 1 in.

Rangoon, May, 1886. In coll. Swinhoe.

549. *Tatobotys pterophoralis.*

Botys pterophoralis, Walker, xxxiv., p. 1413 (1865).

Rangoon, October, 1888. In coll. Swinhoe.

550. *Tatobotys cunealis.*

Botys cunealis, Walker, xxxiv., p. 1420 (1865).

Rangoon, May, 1887. In coll. Swinhoe.

551. *Decticogaster zonulalis.*

Decticogaster zonulalis, Snellen, Tijd. Voor. Ent., 1880, p. 231.

Rangoon, May, 1886. In coll. Swinhoe.

552. *Cnaphalocrocis medinalis.*

Salbia medinalis, Guén., Delt. et Pyral., 201, 148, ♀ (1854).

Botys rutilalis, Walker, xviii., p. 665 (1859).

B. iolealis, Walker, xviii., p. 666.

Cnaphalocrocis jolinalis, Led., Wien. Ent. Mon., vii., p. 385, pl. 12, f. 7 (1863).

Botys accerimalis, Walker, xxxiv., p. 1449 (1865).

Mergui. In I. M., Calcutta.
Rangoon, August, 1888. In coll. Swinhoe.

553. *Dolichosticha venilialis.*

Asopia venilialis, Walker, xvii., p. 373 (1859).
Botys marisalis, Walker, xviii., p. 717 (1859).

Rangoon, August, 1888. In coll. Swinhoe.

554. *Nosophora albiguttalis*, n. sp. (Pl. VIII., fig. 14).

Of a uniform purplish brown colour above. Thorax with a tuft of greyish hairs at the base. Fore wings with a large pure white lunular-shaped patch at the end of the cell, lobed below, excavated on the outer side above, extending from the subcostal vein, where it is nearly pointed, more than half-way down the wing. Under side: Wings same as above; body white; fore legs brown; hind legs grey; tarsi pinkish white. Expanse of wings, $1\frac{1}{10}$ in.

Rangoon, October, 1888. In coll. Swinhoe.

The white spot on fore wings is shaped like the same spot in *N. quadrisignata*, Moore, but differs altogether in colour, and in the absence of the spot on the hind wings.

555. *Lotanga milvinalis.*

Deba milvinalis, Swinhoe, P. Z. S., 1885, p. 875, pl. 57, f. 2.

Rangoon, October, 1888. In coll. Swinhoe.

556. *Marasmia ruralis.*

Botys ruralis, Walker, xviii., p. 666 (1859).
Marasmia cicatricosa, Led., Wien. Ent. Mon., vii., p. 386, pl. 12, f. 8, ♂ (1863).

Rangoon, September, 1888. In coll. Swinhoe.

557. *Marasmia vibiusalis.*

Botys vibiusalis, Walker, xviii., p. 634 (1859).

Rangoon, August, 1888. In coll. Swinhoe.

558. *Isocentris æqualis.*

Botys æqualis, Led., Wien. Ent. Mon., vii., p. 468, pl. 10, f. 3 (1863).

Rangoon, August, 1888. In coll. Swinhoe.

559. *Acharana otreusalis.*

Botys otreusalis, Walker, xviii., p. 637 (1859).
B. triarialis, Walker, xviii., p. 639.
B. neloalis, Walker, xviii., p. 643.
B. abstrusalis, Walker, xviii., p. 663.
B. pharaxalis, Walker, xviii., p. 725.
B. immundalis, Walker, xxxiv., p. 1448 (1865).

Rangoon, July, 1888. In coll. Swinhoe.

560. *Acharana similis.*

Acharana similis, Moore, Lep. Ceylon, ii., p. 286, pl. 180, f. 12 (1885).

Rangoon, September and October, 1888. In coll. Swinhoe.

561. *Ravanoa bilinealis.*

Zebronia bilinealis, Walker, xxxiv., p. 1350 (1865).

Rangoon, August, 1888. In coll. Swinhoe.

Thliptoceras, gen. nov. (Warren MS.).

Fore wings elongate, narrow, with pointed apex and oblique hind margin. Hind wings considerably broader in proportion, characterised particularly by the antennæ of the male, which a little way above the base are flattened out, becoming for a short space much broader, but thinner. The female has the fore wings broader and less acutely pointed than the male.

562. *Thliptoceras variabilis*, n. sp. (Warren MS.).

Fore wing dull yellowish, somewhat sparsely scaled, liable in both sexes to a smoky grey suffusion, which leaves only the apices and fringes yellow; the two lines and reniform stigma slightly darker, often very indistinct; the exterior line is subdentate above, strongly bent in beneath the reniform stigma and repeated on the hind wing. Head, thorax, and abdomen yellow; palpi deeper yellow. Under side like the upper, but duller and without

markings. Both sexes from Dharmsala and other localities in India. Expanse of wings, 18—20 mm.

Rangoon, August, 1888. In coll. Swinhoe.

I have specimens also from Kulu and from Khandalla, all identified by Mr. Warren. One of my Rangoon specimens is suffused in the manner described above with dark brown.

563. *Thliptoceras calvatalis*, n. sp.

Of a pale olive-grey colour. Abdomen of the male very long, extending quite a quarter of an inch beyond the hind wings. Wings sparsely clothed, nearly semihyaline, shining; lines very indistinct and difficult to trace, a grey mark at end of cell, indications of an ante-medial grey line, and a discal outwardly curved line on fore wings; and in one male example an indication of a discal transverse line on hind wings corresponding to the discal line on fore wings. Under side: Wings as above, but paler; body and legs whitish. Expanse of wings, 1—$1\frac{3}{10}$ in.

Rangoon, August, 1888. In coll. Swinhoe.

I have this also from Darjiling and Bhooj. Superficially the males somewhat resemble *Charema vinaccalis*, Moore.

564. *Thliptoceras epicrocalis*, n. sp.

Dark bright ochreous yellow; male with a broad purplish marginal band on both wings; both sexes with a broad purplish cilia, which becomes pale yellowish towards the anal angle of hind wings; a reddish brown lunular mark at end of cell in fore wings; lines of same colour, first ante-medial, nearly straight, from costa one-third from base to the middle of hinder margin, second from costa one-third from apex, half-way down the wing, curving slightly outwards, then straight in to the lunular mark, then (curving slightly outwards) down to the hinder margin near the other line. Hind wings with costal and basal portions whitish; a discal line corresponding to the interior line of fore wing, terminating near the outer margin one-third from anal angle. Expanse of wings, ♂ $\frac{8}{10}$, ♀ $1\frac{1}{10}$ in.

Rangoon, May, 1886; July and August, 1888. In coll. Swinhoe.

565. *Ebulea europsalis*.

Ebulea europsalis, Walker, xviii., p. 749 (1859).

Rangoon, August, 1888. In coll. Swinhoe.

566. *Rehimena phrynealis.*

Botys phrynealis, Walker, xviii., p. 630 (1859).
Rehimena dichromalis, Walker, xxxiv., p. 1492 (1865).

Rangoon, June and July, 1888. In coll. Swinhoe.

567. *Paliga damastesalis.*

Scopula damastesalis, Walker, xix., p. 1013 (1859).

Rangoon. In coll. Swinhoe.

568. *Paliga leucanalis*, n. sp. (Pl. VIII., fig. 15).

Antennæ, palpi, thorax, and fore wings rosy-red; basal half of costal line of fore wings white; ground colour of fore wings is really of a luteous grey, with the costal border and all the veins so thickly covered with rosy-red atoms as to leave the whole of the wing of that colour, with very little of the ground colour showing between the veins here and there. Hind wings and abdomen luteous grey, unmarked; cilia interlined. Expanse of wings, 1 in.

Rangoon. In coll. Swinhoe.

Near *N. cilialis*, Curtis, of Europe; the cilia is, however, rosy red instead of white, as in that species, and it is a brighter insect, being more rosy and yellow throughout.

569. *Udea martinalis.*

Scopula ? martinalis, Walker, xviii., p. 791 (1859).

(Type). Moulmein. In B. M.
Rangoon, May, 1886. In coll. Swinhoe.

570. *Cometura picrogramma.*

Cometura picrogramma, Meyrick, Trans. Ent. Soc. Lond., 1886, p. 226.

Rangoon, May 1886. In coll. Swinhoe.

571. *Euclita fuscicostalis.*

Asopia fuscicostalis, Snellen, Tijd. Voor. Ent., 1883, p. 122, pl. 6, f. 4.

Rangoon, June, 1888; Bassein, August, 1888. In coll. Swinhoe.

572. *Godara comalis.*

Pionea comalis, Guén., Delt. et Pyral., 368, 453, ♂ (1854).

P. incomalis, Guén., *l. c.*, 369, 454, ♀.

Rangoon, September, October, and November, 1888. In coll. Swinhoe.

ASOPIIDÆ.

573. *Chnaura octavialis.*

Syngamia octavialis, Walker, xvii., p. 334, ♂ (1859).

Rangoon, September, 1888. In Phayre Museum, Rangoon.

574. *Sameodes cancellalis.*

Botys cancellalis, Zeller, Lep. Caffr., p. 34 (1852).
Stenia pipleisalis, Walker, xvii., p. 420 (1859).
Lepyrodes ? lepidalis, Walker, xvii., p. 465.
Samea sidealis, Walker, xix., p. 937 (1859).
Hymenia meridionalis, Walker, xxxiv., p. 1314 (1865).
Samea vespertinalis, Saalmuller, Ber. Suck. Gesell., 1880, p. 301.
Sameodes trithyralis, Snellen, Tijd. Voor. Ent., 1880, p. 218 ; and 1883, p. 134, pl. 8, f. 4.

Rangoon, June and September, 1888. In coll. Swinhoe.

575. *Mabra eryxalis.*

Asopia cryxalis, Walker, xvii., p. 371 (1859).

Rangoon, August, 1888. In coll. Swinhoe.

576. *Hymenia recurvalis.*

Phalæna recurvalis, Fabr., Syst. Ent., 407 (1775).
P. angustalis, Fabr., Mant., 222, 309 (1787).
P. (*Pyralis*) *fascialis*, Cram., Pap. Exot., iv., pl. 398, f. o (1782).
Hymenia diffascialis, Hübn., Verz. Bek. Schm., 361, 3453 (1816).
Hydrocampa albifascialis, Boisd., Faun. Ent. Mad. Lep., p. 119, pl. 16, f. 1 (1834).

Moulmein. In B. M.
Rangoon. In coll. Swinhoe.
Mergui. In I. M., Calcutta.

577. *Coptobasis lunalis.*

Botys lunalis, Guén., Delt. et Pyral., 352, 417 (1854).
B. thyasalis, Walker, xviii., p. 734 (1859).

Rangoon, October, 1888. In coll. Swinhoe.

578. *Tamraca torridalis.*

Asopia torridalis, Led., Wien. Ent. Mon., vii., pp. 342, 457, pl. 6, f. 15 (1863).

Rangoon, 1887. In coll. Swinhoe.

579. *Ætholix scissalis.*

Ædiodes scissalis, Walker, xxxiv., p. 1526 (1865).

Rangoon, September, 1888. In coll. Swinhoe.

580. *Agathodes ostentalis.*

Perinephela ostentalis, Geyer, Zutr. Samml. Exot. Schm., x., 417, figs. 833—4 (1837).

Bassein, August, 1888. In Phayre Museum, Rangoon.

581. *Leucinodes orbonalis.*

Leucinodes orbonalis, Guén., Delt. et Pyral., 223, 187 (1854).

Rangoon. In coll. Swinhoe.

MARGARONIDÆ.

582. *Glyphodes bicolor.*

Botys bicolor, Swainson, Zool. Illustr., 1st. ser., ii., pl. 77, f. 2 (1821).

Eudioptis perspicillalis, Zeller, Lep. Micro. Caffr. Kong. Vet. Akad. Handb., p. 53 (1852).

Glyphodes diurnalis, Guén., Delt. et Pyral., 294, 300, pl. 5, f. 5 (1854).

G. parvalis, Walker, xxxiv., p. 1355 (1865).

Mergui. In I. M., Calcutta.

Rangoon. June and July, 1888. In coll. Swinhoe.

583. *Glyphodes bivitralis.*

Glyphodes bivitralis, Guén., Delt. et Pyral., 293, 298 (1854).

Moulmein. In B. M.

Tenasserim. In I. M., Calcutta.

584. *Phakellura indica.*

Eudioptis indica, Saunders, Trans. Ent. Soc. Lond., 1851, p. 163, pl. 12, figs. 5, 6, 7.

Phakellura gazorialis, Guén., Delt. et Pyral., 297, 304 (1854).

Moulmein. In B. M.

Rangoon, July, 1888. In Phayre Museum, Rangoon.

585. *Cydalima conchylalis.*

Margarodes conchylalis, Guén., Delt. et Pyral., 303, 317, pl. 8, f. 9 (1854).

Rangoon, October, 1888. In coll. Swinhoe.

586. *Cydalima laticostalis.*

Margarodes laticostalis, Guén., Delt. et Pyral., 303, 315, ♀ (1854).

M. nitidicostalis, Guen., *l. c.*, No. 316.

Margaronia leodiccalis, Walker, xviii., p. 530, ♂ (1859).

Rangoon, October and November, 1888. In coll. Swinhoe.

587. *Margaronia celsalis.*

Botys celsalis, Walker, xviii., p. 654 (1859).

Rangoon, September and October, 1888. In coll. Swinhoe.

588. *Pachyarches marthesiusalis.*

Margaronia marthesiusalis, Walker, xviii., p. 531 (1859).

Rangoon, October, 1888. In coll. Swinhoe.

589. *Pachyarches psittacalis.*

Parotis psittacalis, Hübn., Samml. Exot. Schm., iii., p. 30 (1825).

Margaronia maliferalis, Walker, xxxiv., p. 1363, ♂ (1865).

Moulmein. In B. M.

590. *Pachyarches vertumnalis.*

Margarodes vertumnalis, Guén., Delt. et Pyral., 309, 333 (1854).

Rangoon, September, 1886. In coll. Swinhoe.

591. *Pygospila tyres.*

Phalæna (*Pyralis*) *tyres*, Cram., Pap. Exot., iii., pl. 263, f. c (1779).

Moulmein. In B. M.

592. *Filodes fulvidorsalis.*

Pinacia fulvidorsalis, Hübn., Geyer, Zutr. Samml. Exot. Schm., 15, 322, figs. 643—4 (1832).

Rangoon, June, 1888. In coll. Swinhoe.

593. *Euclasta defamatalis.*

Ilurgia defamatalis, Walker, xviii., p. 544 (1859).

Rangoon, September, 1888. In coll. Swinhoe.

SPILOMELIDÆ.

594. *Synclera cæsalis.*

Glyphodes cæsalis, Walker, xvii., p. 499 (1859).

Moulmein. In B. M.

595. *Synclera multilinealis.*

Botys multilinealis, Guén., Delt. et Pyral., 337, 380, pl. 8, f. 11 (1854).

Zebronia salomealis, Walker, xvii., p. 476 (1859).

Botys annuligeralis, Walker, xxxiv., p. 1424 (1865).

Moulmein. In B. M.

596. *Omphisa illisalis.*

Botys illisalis, Walker, xviii., p. 653 (1859).

Rangoon, October, 1888. In coll. Swinhoe.

597. *Aripana caberalis.*

Spilomela caberalis, Guén., Delt. et Pyral., 284, 282 (1854).

Zebronia abdicalis, Walker, xvii., p. 480 (1859).

Moulmein. In B. M.

598. *Aripana lactiferalis.*

Zebronia ? lactiferalis, Walker, xvii., p. 480 (1859).

(Type). Moulmein. In B. M.

Rangoon, October, 1888. In coll. Swinhoe.

599. *Notarcha cassusalis.*

Zebronia cassusalis, Walker, xvii., p. 477 (1859).
Z. aurolinealis, Walker, xvii., p. 478.
Botys faustalis, Led., Pyral. Wien. Ent. Mon., vii., p. 471, pl. 10, f. 15 (1863).

Rangoon, July, 1888. In coll. Swinhoe.

600. *Notarcha aurantiacalis.*

Botys aurantiacalis, F. E. von Rösl, Schmett., p. 213, pl. 75, f. 3 (1843).

Rangoon, September and October, 1888. In coll. Swinhoe.

601. *Notarcha plutusalis.*

Zebronia plutusalis, Walker, xvii., p. 478 (1859).
Haritala tigrina, Moore, Lep. Ceylon, iii., p. 312, pl. 182, f. 5 (1886).

Moulmein. In B. M.

Rangoon, August, September, and November, 1888. In coll. Swinhoe.

602. *Chabula acamasalis.*

Zebronia ? acamasalis, Walker, xix., p. 970 (1859).
Z. perspicualis, Walker, xxxiv., p. 1347 (1865).
Botys flexissimalis, Walker, xxxiv., p. 1426.
Heterocnephes strangulalis, Snellen, Tijd. Voor. Ent., 1880, p. 224; and 1884, p. 35, pl. 3, f. 1.

Rangoon, August and September, 1888. In coll. Swinhoe.

603. *Nausinoe euroalis.*

Nausinoe euroalis, Swinhoe, P. Z. S., 1889, p. 420, pl. 44, f. 12.

Rangoon, October, 1888. In coll. Swinhoe.

604. *Nausinoe neptis.*

Phalæna (*Noctua*) *neptis*, Cram., Pap. Exot., iii., pl. 264, f. F (1779).

Moulmein. In B. M.

Rangoon, August, September, and October, 1888. In coll. Swinhoe.

605. *Pagyda rubricatalis*, n. sp.

Luteous white. Fore wings crossed by seven straight brick-red bands, first basal, fourth at the middle, second and third between them, all four equidistant and inclining inwards from the hinder margin, the fourth terminating on the subcostal vein, the fifth from costa one-third from apex, half-way across the wing, sixth discal, seventh submarginal, all three inclining inwards from the costa and paler than the others, the last two running across the wing, but more or less indistinct in parts. Hind wings brick-red, whitish on the costal and outer spaces; a white mark at the end of the cell, and an indistinct discal white line curving outwards and bent inwards below the centre; marginal line on both wings reddish brown; cilia white. Expanse of wings, $\frac{9}{10}$ in.

Rangoon. In coll. Swinhoe.

Differs from *P. salvalis*, Walker, in its more numerous transverse bands, its different coloration, and in the red hind wing.

ENNYCHIDÆ.

606. *Pachyzancla mutualis*.

Botys mutualis, Zeller, Lep. Microp. Caffr. Kongl. Vet. Akad. Handl., p. 40 (1852).
B. stultalis, Walker, xviii., p. 669 (1859).
B. basalis, Walker, xxxiv., p. 1404 (1865).
B. apertalis, Walker. xxxiv., p. 1450.

Rangoon, June and September, 1888. In coll. Swinhoe.

607. *Pachyzancla mellealis*, n. sp.

Greyish yellow; palpi dark brown. Eyes black. Fore wings smeared with pale greyish brown, dark on the costal and marginal borders; a greyish brown ringlet at end of cell, a spot on first median branch one-third from base of wing, another on same branch one-third from outer margin of wing, a discal sinuous almost dentated line curving outwards above, bent inwards below on to the latter spot, from whence it descends to the hinder margin. Hind wings dark greyish brown on the marginal space, with an outwardly curved discal line, similar to and corresponding with the line on the fore wings; cilia greyish brown, nearly black on fore wings in one example. Under side: Wings unmarked, with greyish brown costal space on fore wings, and marginal space on both wings; body white. Expanse of wings, $\frac{8}{10}$—$\frac{9}{10}$ in.

Rangoon, August, 1888. In coll. Swinhoe.

I have this also from Calcutta.

Bands somewhat as in *P. mutualis*, Zeller, but is easily distinguishable by the difference in colour, and by its broad greyish borders.

608. *Pelecyntis absistalis.*

Pyrausta absistalis, Walker, xvii., p. 311 (1859).
Asopia lydialis, Walker, xvii., p. 374.
Botys ustalis, Led., Pyral. Wien. Ent. Mon., vii., pp. 375, 471, pl. 10, f. 14 (1863).
Hedylepta pyraustalis, Snellen, Midd. Sumatra Lep., pl. 71 (1880).
H. ustalis, Snellen, Tijd. Voor. Ent., 1884, p. 37.

Moulmein. In B. M.

Rangoon, September, 1888. In Phayre Museum, Rangoon.

609. *Hedylepta illectalis.*

Botys illectalis, Walker, xviii., p. 658 (1859).
Ebulea opheltesalis, Walker, xix., p. 1010 (1859).

Rangoon, August, 1888. In coll. Swinhoe.

610. *Hedylepta vulgalis.*

Asopia vulgalis, Guén., Delt. et Pyral., 202, 150, pl. 6, f. 8 (1854).
Botys macliusalis, Walker, xviii., p. 703 (1859).
B. reductalis, Walker, xxxiv., p. 1412 (1865).

Rangoon, September, 1888. In coll. Swinhoe.

611. *Entephria appensalis.*

Entephria appensalis, Snellen, Tijd. Voor. Ent., 1884, p. 41, pl. 3, f. 11, 12.

Rangoon, July, 1888. In coll. Swinhoe.

STENIIDÆ.

612. *Eurrhyparodes tricoloralis.*

Botys tricoloralis, Zeller, Lep. Caffr., p. 31 (1852).
Isopteryx ? abnegatalis, Walker, xvii., p. 404 (1859).

Rangoon. In coll. Swinhoe.

613. *Spanista ornatalis.*

Asopia ornatalis, Dup., Lep. Fr., viii., p. 207, pl. 223, f. 8 (1831).

Botys saturalis, Treit., Eur. Schm., Suppl., 2, p. 29 (1835).

Cataclysta? clutalis, Walker, xvii., p. 448 (1859).

Pyralis? deciusalis, Walker, xix., p. 905 (1859).

Rangoon, June, 1888. In coll. Swinhoe.

614. *Maruca testulalis.*

Crocephora testulalis, Hübn., Geyer, Zutr. Samml. Exot. Schm., iv., 12, 315, figs. 629—30 (1832).

Hydrocampa aquatilis, Boisd., Guér., Men. Icon. Reg. Anim. Ins., pl. 90, f. 9 (1844).

Rangoon, June, 1888. In Phayre Museum, Rangoon.

615. *Bocchoris trimaculalis.*

Ædiodes trimaculalis, Snellen, Tijd. Voor. Ent., 1880, p. 232.

Rangoon, 1887. In coll. Swinhoe.

616. *Lepyrodes geometralis.*

Lepyrodes geometralis, Guén., Delt. et Pyral., 278, 271, pl. 8, f. 6 (1854).

Rangoon, July, 1888. In coll. Swinhoe.
Mergui. In coll. Moore.

Eurycraspeda, gen. nov. (Warren MS.)

Fore wing with nearly straight costa; prominent but not acute apex, oblique and curved hind margin; both wings elongate and narrow; labial palpi straight, porrect, twice the length of the head; maxillary short, porrect; tongue and ocelli absent. Antennæ thick, laminated, pubescent beneath. Abdomen with lateral segmental projections; fringe of both wings unusually deep. Neuration: Fore wings: first median nervule starting from three-fourths of the cell, second, third, and fourth at even distances from each other, the third from lower end of cell, the second and fourth before and beyond the end respectively, upper radial from below upper end, last subcostal from upper angle, second, third, and fourth from a common stem. Hind wing with the median nervules as in fore wing, the disco-cellular very deeply angulated

basewards, subcostal and costal separating in the middle of the wing, the branches of the latter at three-fourths.

Akin to *Parthenodes*, Guén.

617. *Eurycraspeda burmanalis*, n. sp. (Pl. VII., fig. 19).

Palpi blackish brown, tips white. Antennæ grey. Head, thorax, and abdomen white. Fore wings blackish brown; a white patch on the hinder margin at the base, and a broad white marginal band which narrows towards the apex, which it does not quite reach, the band is intersected by the veins, and has a central row of brown points or marks, the white from the band runs into the broad brownish fringe opposite the veins, the fringe is paler than the colour of the wing and has a central whitish line, and being so deep makes the band look as if it were submarginal instead of marginal. Hind wings white; a pale greyish brown central transverse band, darkest on the abdominal border, and diffused inwardly; cilia as in fore wing. Expanse of wings, $\frac{6}{10}$ in.

Bassein, September, 1888. In coll. Swinhoe.

HYDROCAMPIDÆ.

618. *Parapoynx oryzalis.*

Paraponyx oryzalis, Wood-Mason, Rice Pests of Burma, Calcutta, 1885, with plate.

Burma. In I. M., Calcutta.

619. *Parapoynx stagnalis.*

Nymphula stagnalis, Zeller, Lep. Microp. Caffr. Kongl. Vet. Akad. Handl., p. 26 (1852).

Rangoon, 1887. In coll. Swinhoe.

620. *Parapoynx votalis.*

Oligostigma votalis, Walker, xvii., p. 433 (1859).

Rangoon, May and June, 1888. In coll. Swinhoe.

Girtexta, gen. nov.

♂. Fore wing elongated, triangular; costa almost straight, apex pointed, posterior angle hardly rounded, posterior margin slightly convex towards the base, cell extending half the length of the wing; five subcostal branches, first emitted close to end of cell, second from the end, third from second at half its length, fourth from the third at nearly half its length, fifth also from end of cell;

disco-cellulars extremely slender, concave, radial from the middle; four median branches, the two upper on a footstalk from end of cell at one-fifth beyond its end, next also from end of cell, the lowest at one-fifth before end of cell; submedian straight. Hind wing hatchet-shaped, apex slightly produced, exterior margin convex in the middle, cell short, less than one-third the length of the wing; three subcostals, first and third from end of cell, second from below first at half its length; disco-cellular extremely slender, concave, radial from its extreme lower end, upper and middle median branches from end of cell, lower at one-fourth, submedian and internal veins straight. Body long, slender, and extending half its length beyond the hind wings in the male; palpi projected forward considerably, flattened at the sides and pointed at the tip, hirsute. Antennæ slender, minutely serrated from about half its length to the tip. Legs long, smooth; middle tibiæ armed with two terminal spurs, hind tibiæ with two pairs of spurs, one pair medial the other terminal.

Distinguishable from the genus *Cataclysta* by the comparatively shorter wings and thin triangular form, the porrect character of the palpi in both sexes, and also in its robust form.

621. *Girtexta argentuosalis*, n. sp.

Luteous. Fore wings with six glistening silvery upright transverse nearly straight bands; subbasal, ante-medial, medial, and post-medial equidistant; fifth discal curved and broken below the middle, the lower portion terminating on the hinder angle; sixth submarginal, not reaching the hinder angle. Hind wings paler; costal portion whitish, patched with glistening silver, indicating portions of the bands corresponding to the outer bands of the fore wings; but in the eight examples before me—all good specimens—the submarginal band is the only one approaching completeness; marginal line on both wings brown; cilia whitish. Under side dull greyish, with some of the bands, of a dull grey colour, of the fore wings showing through. Expanse of wings $\frac{6}{10}$—$\frac{8}{10}$ in.

Rangoon, August and September, 1888. In coll. Swinhoe.

I have this also from the Nilgiri Hills.

Callinaïas, gen. nov. (Warren MS.).

Fore wing narrow, with straight costa, rounded apex, and curved hind margin. Hind wing twice as broad as fore wing, with the

anal angle somewhat produced. Legs long, slender, delicate; labial palpi long, porrect. Tongue short; maxillary palpi and ocelli not visible. Antennæ short, thick, laminated. Eyes large. Neuration: Fore wings: cell long, quite two-thirds of the length of the wing; submedian running straight to the hind margin above the anal angle; first median nervule starting from four-fifths of the cell, second and third together from the lower end, the latter forming a straight continuation of the median; fifth (lower radial) from a little above the lower end of the cell, upper radial from the disco-cellular below the cell; last three subcostal nervules on a common stem, the first two separating only a short way before the apex, apparently only *one* other nervule between them and the costal. Hind wing with no disco-cellular; first median rising at scarcely one-third, second and third separating at about centre, fourth apparently independent, produced basewards to near the base of the median; subcostal leaving the costal at one-third; the two branches of the latter parting at about one-third.

This peculiar neuration appears to warrant the erection of a new genus. The single example, a female, is of delicate structure; its position will be among the genera of the *Hydrocampidæ* that have porrect palpi.

622. *Callinaïs gracilentalis*, n. sp. (Pl. VIII., fig. 6).

Eyes black; palpi and front of head dark blackish brown. Antennæ, top of head, body, and fore wings milky white. Fore wings with two ochreous transverse indistinct linear marks on the costa, indicating the commencement of two thin transverse lines, one in the centre and the other near the large apical blackish brown spot, which is slightly excavated below, and is paler on the outer margin; a very slight ochreous tinge on outer portion of the wing. Hind wings white, suffused with pale ochreous brown, which darkens on the hinder margin; cilia brownish, interlined with white. Under side white; fore wing as above; hind wing with the outer portion brown; abdomen with the anal portion brownish, with lateral pure white tufts. Expanse of wings, ½ in.

Rangoon, September, 1888. In coll. Swinhoe.

623. *Hydrocampa palliolatalis*, n. sp.

Ochreous white. Fore wings with the ground colour white, smeared with ochreous; base, costal, and outer portions nearly all ochreous; central and lower portions of wing with patches and parts ochreous; in one specimen the costa is all ochreous, in

another it is patched with that colour; a white band running through the ochreous discal portion, marked on each side with brown, straight down from the costa one-fourth from apex, halfway across the wing, then curves deeply inwards and then down to the hinder margin just beyond the middle, but the curved portion is very indistinct and only traceable on one wing in one example; marginal line grey, with white diffuse points or spots; cilia pinkish grey, with brown patches. Hind wings yellowish grey, with an indistinct grey band in the centre. Expanse of wings, $\frac{5}{10}$—$\frac{6}{10}$ in.

Rangoon, August and September, 1888. In coll. Swinhoe.

Allied to *H. fengwhanalis*, Pryer.

624. *Hydrocampa depunctalis*.

Hydrocampa depunctalis, Guén., Delt. et Pyral., 274, 265 (1854).

Zebronia? decussalis, Walker, xvii., p. 481 (1859).

Rangoon, August, 1888. In coll. Swinhoe.

625. *Hydrocampa responsalis*.

Diasemia responsalis, Walker, xxxiv., p. 1326, ♀ (1865).

Paraponyx turbata, Butler, Trans. Ent. Soc. Lond., 1881, p. 586, ♀.

P. marmorea, Meyrick, Trans. Ent. Soc. Lond., 1885, p. 434, ♀.

Isopteryx enyxalis, Swinhoe, P. Z. S., 1885, p. 869, ♀.

Cymoriza linealis, Moore, Descr. Ind. Lep. Atk., iii., p. 210, ♂ (1887).

Rangoon, June, July, and September, 1888. In coll. Swinhoe.

626. *Pramadea carbatinalis*, n. sp. (Pl. VIII., fig. 13).

Of a uniform dark olivaceous brown colour. Fore wing with a brown ringlet in upper centre of cell, and brown-ringed lunular mark at upper end; a lunular discal yellowish line curving outwards above and bent inwards below, the lunules marked inwardly with dark brown, and two small brown patches, one above the other, on the hinder margin just beyond the middle, inside the line where it extends downwards from the bend; a corresponding lunular line on the hind wings, marked similarly, having a great outward curve in its centre, a yellowish spot inside the cell, with an adjoining brown mark on its inner side; marginal line of both

wings brown; cilia grey and brown alternately, with a basal interline alternately yellow and brown. Under side paler; markings similar; tarsi with yellowish bands. Expanse of wings, $1\frac{3}{10}$ in.

Rangoon, 1886. In coll. Swinhoe.

Allied to *Pramadea denticulata*, Moore; differs in the absence of the interior line, the difference in colour, and in the form of the discal line.

SICULIDÆ.

627. *Durdara myrtæa.*

Phalæna (*Noctua*) *myrtæa*, Drury, Ins. Exot., ii., 4, pl. 2, f. 3 (1773).

Bhamo. In Phayre Museum, Rangoon.

628. *Rhodoneura acaciusalis.*

Pyralis acaciusalis, Walker, xix., p. 901 (1859).

(Type). Moulmein. In B. M.

629. *Rhodoneura bastialis.*

Pyralis bastialis, Walker, xix., p. 902 (1859).

(Type). Moulmein. In B. M.

630. *Rhodoneura puralis.*

Pyralis ? puralis, Walker, xxxiv., p. 1238 (1865).

Mergui. In I. M., Calcutta.

631. *Rhodoneura tetraonalis.*

Rhodoneura tetraonalis, Moore, P. Z. S., 1877, p. 617, pl. 60, f. 10.

Rangoon, July, August, and October, 1888. In coll. Swinhoe.

632. *Pharambara trifascialis.*

Pyralis trifascialis, Moore, P. Z. S., 1877, p. 614, pl. 60, f. 9.

Rangoon. In coll. Swinhoe.

633. *Microsca subroscalis.*

Microsa subroscalis, Leech, Entom., xxii., 1889, p. 66, pl. 4, f. 14.

Rangoon, August, 1888. In coll. Swinhoe.

634. *Morova angulalis*.

Morova angulalis, Moore, Descr. Ind. Lep. Atk., iii., p. 214 (1887).

Rangoon. In coll. Moore.

PYRALIDÆ.

635. *Oromena reliquenda*.

Briarda reliquenda, Walker, xv., p. 1802 (1858).

Mergui. In I. M., Calcutta.

636. *Stemmatophora roborealis*.

Pyralis roborealis, Swinhoe, P. Z. S., 1885, p. 865, pl. 57, f. 1.

Rangoon, May, 1886. In Phayre Museum, Rangoon.

637. *Stemmatophora tactilis*, n. sp.

Of a uniform dark chocolate-brown colour. Antennæ and palpi pale reddish brown; abdominal tuft brown, with some reddish hairs. Wings with two transverse flesh-coloured lines; ante-medial and discal nearly straight, and meeting together in a rounded form close to the abdominal margin of hind wings near the anal angle, the ante-medial line suddenly bent in on the costa of the fore wings, the discal line slightly sinuous on fore wings. Under side slightly paler, greyish on inner marginal space of fore wings; middle and hind tarsi pale flesh-colour. Expanse of wings, $1\frac{1}{10}$—$1\frac{2}{10}$ in.

Rangoon, September, 1888. In coll. Swinhoe.

I have this also from the Nilgiri Hills.

638. *Stemmatophora denticulata*, n. sp. (Pl. VIII., fig. 7).

Antennæ, palpi, head, thorax, and fore wings dark olive-brown; a blackish lunular mark at the end of cell, an ante-medial pale indistinct slightly curved line, a denticulated pale yellowish discal outwardly curved line with blackish marks inside the denticulations; between these two lines the costal line is closely spotted with pale yellowish points. Hind wings and abdomen greyish white, brownish on the costal and apical borders of the wing; marginal line on both wings brown; cilia grey, interlined with brown. Expanse of wings, $1\frac{2}{10}$ in.

Thyetmyo, 1887. In coll. Swinhoe.

Looks superficially like an *Agrotis* with brown fore wings.

639. *Pyralis ibycusalis.*

Pyralis ibycusalis, Walker, xix., p. 899 (1859).

Rangoon, May, 1886; June, 1888. In coll. Swinhoe.

640. *Pyralis pictalis.*

Asopia pictalis, Curt., Brit. Ent., xi., pl. 527 (1834).
Pyralis pronœalis, Walker, xix., p. 906 (1859).
Myelois bractiatella, Walker, xxvii., p. 36 (1863).
Pyralis clachia, Butler, Ill. Typ. Lep. Het. B. M., iii., p. 70, pl. 58, f. 3 (1879).

Rangoon, July, 1888. In coll. Swinhoe.

641. *Pyralis umbrosalis.*

Pryalis umbrosalis, Warren MS. in ed.

Rangoon, May, 1886. In coll. Swinhoe.

642. *Pyralis regina.*

Pyralis regina, Butler, Ann. Mag. N. H., ii., p. 452 (1879).

Rangoon, May, 1888. In coll. Swinhoe.

643. *Herculia lucillalis.*

Pyralis lucillalis, Walker, xvii., p. 268 (1859).

Rangoon, July, 1888. In Phayre Museum, Rangoon.

644. *Haculia suffusalis.*

Pyralis suffusalis, Walker, xxxiv., p. 1235 (1865).

Rangoon. In Phayre Museum, Rangoon.

645. *Taurica sikkima.*

Taurica sikkima, Moore, Descr. Ind. Lep. Atk., iii., p. 202 (1887).

Rangoon, July, 1886. In coll. Swinhoe.

646. *Endotricha decessalis.*

Endotricha decessalis, Walker, xvii., p. 390 (1859).

Rangoon, July, 1888. In coll. Swinhoe.

647. *Vitessa suradeva.*

Vitessa suradeva, Moore, Cat. Lep. E. I. C., ii., p. 299, pl. 7 *a*, f. 7 (1858).

Mergui. In I. M., Calcutta.

PTEROPHORIDÆ.

648. *Pterophorus lacteipennis.*

Aciptilus lacteipennis, Walker, xxx., p. 949 (1864). (Type). Moulmein. In B. M.

CRAMBITES.

PHYCITIDÆ.

PHYCITINÆ.

649. *Ankova meridionalis.*

Nephopteryx meridionalis, Walker, xxvii., p. 64 (1863). (Type). Moulmein. In B. M.

SCHŒNOBIDÆ.

650. *Apurima xanthogastrella.*

Apurima xanthogastrella, Walker, xxvii., p. 194 (1863).
Rupela? degenerella, Walker, xxviii., p. 524 (1863).
Lithosia? cramboides, Walker, xxxi., p. 230 (1864).

Mergui. In I. M., Calcutta.

651. *Brihaspa atrostigmella.*

Brihaspa atrostigmella, Moore, P. Z. S., 1867, p. 666, pl. 33, f. 13, ♂.

Rangoon, August, 1888. In coll. Swinhoe.

652. *Schœnobius bipunctifera.*

Tipanæa bipunctifera, Walker, xxviii , p. 523 (1863).
Chilo gratiosellus, Walker, xxx., p. 967 (1864).
Schœnobius punctellus, Zeller, Monog. Chilo et Cramb., p. 4 (1863).

Mergui. In I. M., Calcutta.

Crambostenia, gen. nov. (Warren MS.).

Allied to *Cirrhocrista*, Led., but distinguished by the acutely-pointed fore wings, and very straight hind margin of both wings; labial palpi porrect, twice as long as the head; maxillary palpi

likewise porrect, resting on the labial; forehead with a pointed projection, which forms one surface with the palpi; ocelli and tongue absent. Antennæ short, stouter near the base, weakly and irregularly ciliated in male. Wings white, glossy, with costa, hind margin, two transverse lines, and reniform stigma brown.

Type, *C. acciusalis*, Walker.

653. *Crambostenia angustifimbrialis*, n. sp. (Warren MS.).

Wings pearly white, with the costa fulvous, the streak thinning out towards the apex; first line appearing only as a small projection from the costal streak, second a little more distinct for a short distance from the costa, and again above the middle of the inner margin; disco-cellular vein thinly fulvous-tinged, thickened into two dots at either end; fringe white tinged with fulvous, and with a fulvous basal line, which is itself preceded by a row of almost contiguous darker dashes at the end of the veins. Hind wings like fore wings, with traces of two fine transverse lines, visible only near the inner margin. Abdomen: Under side of wings, middle and hind legs, white; palpi, sides of thorax on a level with the costal streak of the fore wings, and fore tibiæ, fulvous. Expanse of wings, 25 mm.

Burma. In B. M.
Rangoon, September, 1888. In coll. Swinhoe.

654. *Eschata percandida*, n. sp.

Glistening silvery white. Eyes black. Fore wings sparsely irrorated with grey atoms on the outer portion; a discal duplex transverse line, which bends outwardly above, greyish in the male, glistening and metallic-silver in the female; a submarginal duplex grey line, slightly silvery in its interior in the male, glistening and metallic in the female, with glistening silvery streaks between the bands inside the veins; marginal black points between the veins in both sexes; cilia white, in the female glistening and quite golden in some lights. Hind wings unmarked, and, though bright and shining, they have not the beautiful glistening sheen of the fore wings. Under side pure white, unmarked. Expanse of wings, ♂ $1\frac{7}{10}$, ♀ $2\frac{1}{10}$ in.

Rangoon, October, 1888. In coll. Swinhoe.

Allied to *E. gelida*, Walker; is much larger, and differs in the disposition and nature of the transverse lines.

CRAMBIDÆ.

655. *Chilo dodatellus.*

Chilo dodatellus, Walker, xxx., p. 966 (1864).
C. aditellus, Walker, xxx., p. 967.
(Type, *aditellus*). Moulmein. In B. M.

TORTRICES.

TORTRICIDÆ.

TORTRICINÆ.

656. *Pandemis eductana.*

Pandemis eductana, Walker, xxviii., p. 310 (1863).
(Type). Moulmein. In B. M.

657. *Dichelia privatana.*

Dichelia privatana, Walker, xxviii., p. 320 (1863).
(Type). Moulmein. In B. M.

CONCHYLINÆ.

658. *Conchylis flavicostana.*

Conchylis flavicostana, Walker, xxviii., p. 361 (1863).
(Type). Moulmein. In B. M.

GRAPHOLITHINÆ.

659. *Grapholitha* (*Semasia*) *swinhoeiana*, n. sp. (Walsingham MS.). (Pl. VIII., fig. 19).

Head pale ochreous, with a few brown scales at the sides, having a slight projecting frontal tuft. Palpi short, the apical joint distinctly appearing beyond the thickly clothed 2nd joint, pale ochreous. Thorax greyish fuscous.

Fore wings long, narrow, with straight costal and dorsal margins, the apex rounded, apical margin strongly indented on vein 4, pale ochreous with some umber scaling, especially about the middle; the costal half of the wing is covered by a greyish fuscous shade from the base to the apex, where it becomes attenuated; on this is a longitudinal hoary subcostal streak, above which a series of short costal geminations extend throughout the wing-length; two small fuscous dots, followed by a very short transverse shade, indicate the position of the usual ocelloid patch, which is situated higher than usual, and is opposite the marginal indentation; the cilia are pale ochreous interrupted by two streaks of umber scales at the apex.

Hind wings very broad, with rather pronounced abdominal angle, half as wide again as the fore wing.

Abdomen and legs pale ochreous shaded with greyish fuscous; under sides of both wings clouded with fuscous, except at the extreme apical margin.

In neuration this remarkable species differs from nearly all *Tortricidæ* with which I am acquainted in the absence of a closing vein to the cell of the hind wing. *Grapholitha roessleri*, Zeller, and *G. vestaliana*, Zeller, both from the United States, resemble it in this respect, and it is worthy to be classed with those species under a new generic name; in the form of the fore wings, with the conspicuous indentation of the apical margin, it agrees with the North American genus *Proteopteryx*, Wlsm., but this has the cell of the hind wing closed. The expanse of the wings of the single female specimen before me is 31 mm., doubling the size of *Proteopteryx*, and equalling or surpassing the average of *G. roessleri*.

Rangoon, July, 1888. In coll. Swinhoe.

TINEIDÆ.

660. *Cervaria xylinella.*

Cervaria xylinella, Walker, xxxv., p. 1823 (1866).

(Type). Moulmein. In B. M.

PLUTELLIDÆ.

GELECHINÆ.

661. *Thisizima ceratella.*

Thisizima ceratella, Walker, xxix., p. 820 (1864).

(Type). Moulmein. In B. M.

662. *Sagora rutilella.*

Sagora rutilella, Walker, Char. Undescr. Lep. Het., p. 101 (1869).

Karen Hills, February and March, 1887. In coll. Swinhoe.

Errata.—P. 271, line 18, after "*Hapalia? albicostalis*, n. sp." add "(Pl. VIII., fig. 14)"; p. 273, line 8 from top, for "fig. 14" read "fig. 16."

Explanation of Plates VII. & VIII.

PLATE VII.

Fig. 1. *Leucania subnitens*, n. sp., p. 218.
2. *Panagra idea*, n. sp., p. 211.
3. *Micronia sparsaria*, Walker, p. 215.
4. *Chærodes ? umbrosa* ♂, n. sp., p. 203.
5. *Angerona figlina*, n. sp., p. 205.
6. *Leucania basilinea*, n. sp., p. 220.
7. ,, *albivenata*, n. sp., p. 217.
8. *Zethes exigualis*, n. sp., p. 253.
9. *Anisodes rapistriaria*, n. sp., p. 210.
10. *Bryophila conjecturalis*, n. sp., p. 222.
11. *Aramuna lutosa* ♂, n. sp., p. 225.
12. *Leucania homopterana*, n. sp., p. 219.
13. *Axylia abstracta*, n. sp., p. 221.
14. *Daxata multifasciata*, n. sp., p. 256.
15. *Symitha punctata*, n. sp., p. 236.
16. *Zethes compactilis*, n. sp., p. 251.
17. *Bagada diffisa*, n. sp., p. 224.
18. *Lycauges annularia*, n. sp., p. 214.
19. *Eurycraspeda burmanalis*, n. sp., p. 285.

PLATE VIII.

Fig. 1. *Armana nigræricta*, n. sp., p. 250.
2. *Rusicada brunnea* ♀, Moore, p. 230.
3. *Hypoepa opacaria*, n. sp., p. 264.
4. *Hypætra occularia*, n. sp., p. 246.
5. *Bertula analis*, n. sp., p. 263.
6. *Calinaïs gracilentalis*, n. sp., p. 287.
7. *Stemmatophora denticulata*, n. sp., p. 290.
8. *Phurys enervis*, n. sp., p. 231.
9. *Zanclognatha invenustua*, n. sp., p. 268.
10. *Zethes palliolata*, n. sp., p. 252.
11. *Bertula ethnica*, n. sp., p. 263.
12. *Hadennia ignicoma*, n. sp., p. 264.
13. *Pramadea carbatinalis*, n. sp., p. 288.
14. *Hapalia ? albicostalis*, n. sp., p. 271.
15. *Paliga leucanalis*, n. sp., p. 276.
16. *Nosophora albiguttalis*, n. sp., p. 273.
17. *Hapalia perbonalis*, n. sp., p. 272.
18. ,, *cascalis*, n. sp., p. 271.
19. *Grapholitha* (*Semasia*) *swinhociana*, n. sp., p. 294.

VII. *On New Longicornia from Africa and Madagascar.*

By Charles J. Gahan, M.A., F.E.S.

[Read March 5th, 1890.]

Plate IX.

The following paper forms a slight contribution to our knowledge of the Longicorn fauna of Africa and Madagascar. In addition to describing some new genera and species, I have endeavoured to put right a few of the errors which have crept into the catalogue of Gemminger and Harold. There remain to be made many more corrections, chiefly referring to the synonymy and generic position of species, and I hope, at a future time, to be able to devote a paper specially to this subject.

PRIONIDÆ.

Closterus oculatus, n. s.

♂. Oculis supra subtusque fere contiguis: antennis articulo tertio quam scapo fere duplo longiori; prothorace supra sparsim punctato et vage fulvo-pubescente, lateraliter utrinque uni-dentato; elytris sparsim punctulatis, postice subcoriaceis, singulisque obsolete quadri-costatis. Long. 28, lat. 9 mm.

Hab. Madagascar.

Eyes almost touching below as well as above. Prothorax sparsely tawny pubescent above, somewhat sparsely and rather feebly punctured; the lateral margins each with a single median tooth, the antero-lateral angles subobtuse, the postero-lateral angles rounded. Scutellum punctured at the sides, smooth in the middle. Elytra subcoriaceous, very feebly and very sparsely punctured, each with four raised lines. Antennæ with the third joint nearly twice as long as the scape, the fourth and following joints (the eleventh excepted) subequal or gradually decreasing in length.

From *C. flabellicornis*, Serv. (the only other species of the genus of which the male has been described), the present species differs, *inter alia*, by the sub-contiguity of the eyes below, by the different form of the lateral margins of the prothorax, by the greater relative length

of the third joint of the antennæ, by the much feebler and sparser punctuation of the elytra, as well by the more distinct raised lines on the latter. The remaining two species of the genus—*C. major*, Waterh., and *C. janus*, Thoms.—have been described from female forms only; and their characters do not permit me to regard the form just described as the male of either.

Closterus serraticornis, n. s.

♂. Fusco-ferrugineus; oculis magnis supra fere contiguis, subtus approximatis; antennis corpore longioribus, articulis a tertio ad decimum apice intus angulatim productis; prothorace crebre subrugosoque punctato, pube sparsa fulvo-ferruginea obtecto, marginibus lateralibus angulis posticis subrotundatis; elytris subcoriaceis, sparsim punctulatis, singulisque lineis elevatis quinque vel sex; pectore dense punctulato, et fulvo-ferrugineo pubescente; abdomine breviter sparsimque pubescente et sparsim punctulato; pedibus sat dense punctulatis, femoribus pubescentibus. Long. 33—35, lat. 11 mm.

Hab. Madagascar.

Eyes almost touching above, about a millimetre apart below. Prothorax much broader than long, very closely and somewhat rugosely punctured, clothed with a sparse and rather long tawny red pubescence; the lateral margins with the median tooth distinct, the anterior angles scarcely prominent, the posterior angles obtuse and almost rounded. Elytra somewhat coriaceous, rather sparsely punctulate, and each with five or six raised longitudinal lines which do not reach the apex and of which some are almost obsolete. Body underneath, the abdomen excepted, densely punctulate and clothed with a longish reddish tawny pubescence; abdomen sparsely punctulate, and with a short and very sparse pubescence. The legs thickly enough punctulate, and the femora with a rather long pubescence. Antennæ about a fourth longer than the body, with the joints, from the third to the tenth, each produced at its inner apical termination into an acutely angular tooth.

The present species is very distinct by the structure of its antennæ, and ought to be, perhaps, on this account, formed into a separate genus; but as I find no other character of sufficient importance by which to separate it, I think it best to place it in the genus *Closterus*.

ANŒME (*Monodesminæ*), n. g.

Head large and, together with the eyes, nearly as broad as the prothorax in the middle; very convex below, mandibles horizontal. Palpi with their last joint quite cylindrical. Eyes large, closely approximated above, moderately separated below, reaching almost to the base of the mandibles in front. Prothorax tranverse, rather short, obtusely dilated at the middle of each side, and provided with a lateral carina which curves down on each side from the posterior border to reach as far as the outer termination of the coxal cavity. Elytra rounded at the apex, each with a single longitudinal keel placed on the disk. Antennæ longer than the body (♂), with the scape rather short, the third joint almost twice as long as the scape, the fourth and following joints slightly and gradually decreasing in length. With the joints from the third to the tenth compressed towards the inner border, and each angulate at its inner apical termination. Legs subequal, the posterior a little longer; femora rather short, strongly enough compressed and dilated. Anterior coxæ strongly transverse; the anterior cotyloid cavities widely enough open behind.

This genus has been necessary for the reception of *A. nigrita*, Chev., a species altogether foreign to the genus *Oeme*, in which Chevrolat and Andrew Murray had placed it, and one on which Murray relied to support his favourite theory of a connection between the faunæ of Africa and South America. The genus forms one of the connecting links between the *Prionidæ* and *Cerambycidæ*, and, according to Lacordaire's system, ought to be placed in the former rather than in the latter family. The palpi are of a form very exceptional in both these families, and resemble more those of the *Lamiidæ*.

Type:—*A. nigrita*.

Oeme nigrita, Chev. Rev. et Mag. de Zoologie, 1855, p. 183.

Oeme nigrita, Murr. Ann. and Mag. Nat. Hist., 4 Ser., vol. vi., p. 166, pl. 2, fig. 1.

Hab. Old Calabar.

CERAMBYCIDÆ.

Xystrocera chalybeata, n. sp.

Chalybeata, subopaca; prothorace minutissime creberrimeque punctulatis, dorso postice (♂) plaga, scutiforma, subnitida; elytris rugoso-punctatis, singulis lineis duabus vel tribus vix elevatis;

antennis (♂) corpore plus sesqui-longioribus, articulis quinque primis scabrosis, (♀) corpore vix brevioribus. Long. 11—13 mm.

Hab. Nyassa.

Almost wholly of a dull steel blue colour, with the antennæ inclined to black. Prothorax very densely and finely punctulate. Elytra rugosely punctured, each with two or three very feebly raised longitudinal lines, apices somewhat obliquely rounded.

♂. With the prothorax slightly longer than broad, with a scutiform subnitid space on the disk posteriorly; with the antennæ more than half as long again as the body, with the first five joints thicker and scabrous. Abdomen steel blue, with what appears to be the last dorsal segment modified into a broad bifurcate process, with a somewhat similarly shaped but smaller process, beneath it, with both these processes projecting beyond the apex of the fifth ventral segment.

♀. With the prothorax broader than long, the disk destitute of a shining space. With the antennæ scarcely as long as the body, with the scape scabrous, the four following joints somewhat asperately punctured. Abdomen underneath fulvous brown, with the apex of the last segment steel blue.

In this species the scape of the antennæ is provided at the apex with a sharp carina, limiting a smooth terminal groove, but it is not produced into a spinous or angulate process on the inner side, as is the case with the majority of the species of the genus.

Allogaster unicolor, n. s.

A. geniculatæ affinis et similis, sed differt antennis rufo-testaceis, pedibus fere omnino testaceis; processu prosterni postice abrupte angustata.

Hab. Nyassa? and Natal.

Reddish testaceous, with a faint tawny ochreous pubescence. Prothorax briefly and sharply enough spined on the middle of each side; the disk with a callosity in the middle, and with two small and very feebly raised tubercles anteriorly. Elytra closely punctured, conjointly rounded at the apex. Legs testaceous, with the extreme apical border of the femora blackish. Antennæ wholly reddish testaceous. Each of the first four abdominal segments (♂) with a large transverse tomentose depression.

The prosternal process has, in the present species, a form unlike that of any Cerambycid known to me. This

process is moderately broad in front, is slightly dilated at the point where it arches over to bend down behind the coxæ, and behind the dilatation is abruptly narrowed. The anterior coxal cavities remain widely enough open behind. In *A. geniculata*, Thoms., the prosternal process has a somewhat similar form, but from the postmedian dilatation it is gradually narrowed to its posterior extremity, the latter being somewhat pointed. The mesosternal process in both species is broader than the prosternal, is feebly and triangularly emarginate in the middle of its apical border, and on each side posteriorly has a small process abutting against the coxa. There are two male examples of the new species in the collection. The female of the genus has not been described, and is still unknown to me. Lacordaire and Thomson placed *Corethrogaster annulipes*, Chev., (described from the female only) in the genus; but this species, as well as the *Heterogaster semifemoratum* of Chevrolat, belong to the genus *Paræme* of Aurivillius.

Taurotagus brevipennis, n. s.

Rufo-brunneis, pube holosericea grisea obtectus; prothorace lateraliter et supra inæquali nec plicato; elytris (♂) prothorace triplo-longioribus; elytris (♀) prothorace plus triplo longioribus. Long. 25—30 mm.

Hab. Yoruba (*Capt. Moloney*), Sierra Leone.

Reddish brown, with a rather thin silvery grey pubescence, which on the elytra gives reflections like watered silk. Prothorax uneven towards the sides, with four feeble obtuse tubercles on the disk. Elytra rounded at the apex, those of the male three times as long as the prothorax in the middle; those of the female a little more than three times as long. Antennæ in the male about a fourth longer than the body, in the female surpassing but little the middle of the elytra. Prosternal process vertical or subvertical behind. Head underneath, between the eyes, without a distinct groove or ridge.

This species has all the characters which Lacordaire has given for the genus *Taurotagus*, with the exception that the prothorax is not transversely wrinkled, but is made uneven by some obtuse and feebly raised tubercles.

Hercodera, n. g.

Head with the antennal tubers scarcely raised, with the front short, with the eyes coarsely facetted, deeply emarginate, and scarcely surpassing the insertion of the antennæ in front. Antennæ sparsely ciliate, a little longer than the body (♀ ?), with the scape subclavate, shorter than the third joint, the fourth joint about equal in length to the scape, the fifth to the eighth subequal, each slightly shorter than the third, the last three joints decreasing in length; the third and fourth joints each armed with a small spine at the apex, some of the following joints also provided with an exceedingly minute spine. Prothorax longer than broad, slightly angular and unarmed at the sides, and somewhat constricted just before the base. Elytra nearly linear, and subtruncate or rounded at the apex. Legs moderately long, with the femora stalked at the base, and gradually swollen beyond the middle; with the first joint of the posterior tarsi as long as the two succeeding joints combined. Prosternal process rather narrow; feebly arched; scarcely dilated at its posterior extremity. Mesosternal process nearly flat. Anterior cotyloid cavities open behind. Intermediate cotyloid cavities closed on the outside.

I have placed this genus near *Atesta*, in the group *Phoracanthinæ*, though it might equally as well, perhaps, be placed in the group *Callidiopsinæ*. The presence of spines on the antennæ is, however, very exceptional in the latter, while it is characteristic of the former group.

Hercodera fasciata, n. s. (Pl. IX., fig. 1).

Rufo-testaceis, antennis pedibusque (femoribus medio exceptis) nigris; prothorace reticulato-punctato; elytris dense fortiterque punctatis, æneo-viridis, fascia lata testacea quæ pars major pone medium. Long. 10 mm.; lat. 2½ mm.

Hab. Masai-land (*F. J. Jackson, Esq.*).

Reddish testaceous, with a few scattered greyish hairs. Head obsoletely punctured. Prothorax at the sides and above covered with broad shallow regular punctures, giving it a finely reticulated appearance. Elytra very thickly and strongly punctured, with the punctures becoming finer and less dense posteriorly; metallic green, with a very broad transverse testaceous band beginning a little behind the basal third, and extending as far as the apical fourth of the elytra; this band slightly triangularly produced along the suture in front. Apices of the elytra feebly truncate, almost rounded. Legs black, with the thickened clavate portion of the femora reddish testaceous. Antennæ black.

Metobrium (*Obriinæ*), n. g.

Head large, broad between the eyes, attenuated posteriorly, concave between the antennal tubercles; with the eyes prominent, coarsely facetted, feebly emarginate in front, widely separated above. Antennæ more than half as long again as the body, with the third and fourth joints short, subequal, together scarcely longer than the scape; with the fifth and following joints compressed, each longer than the third and fourth combined. Prothorax twice as long as broad, horizontal for a short distance at the base, thence inclined upwards and anteriorly bent forwards so as to form with the head a sub-semicircular curve; the middle of each side with an obtuse tubercle or angle, in front of and behind which the prothorax is slightly constricted. Elytra linear, a little retracted and truncate at the apex, with the lateral margins sinuate in the middle. First segment of the abdomen as long as the three following united. Prosternal process subhorizontal posteriorly, and produced a short distance behind the cotyloid cavities; the latter completely closed in behind. Intermediate cotyloid cavities open on the outside.

Type:—*Metobrium elegans*, Fairm., Ann. Soc. Ent. de France, 1887, p. 334, pl. 3, fig. 9.

A figure of this species and a very full description have been given by M. Fairmaire, but he has erroneously referred it to the genus *Obriaccum*, of Thomson. From this genus it is at once separated by the greater width of the head, the length and curvature of the thorax, and the different relative proportions of the basal joints of the antennæ.

The genus *Obriaccum* is, as pointed out in M. Lameere's supplement, synonymous with the previously characterised *Ossibia* of Pascoe.

Hypargyra, n. g.

Head concave between the antennal tubercles; front subvertical, a little broader than long, feebly transversely impressed near the base. Antennæ a little longer than the body, with joint 3 much longer than the scape, with joints 4—6 subequal, each shorter than 3rd, with joints 7—10 gradually decreasing in length, 11th longer than 10th. Eyes finely facetted, deeply emarginate. Prothorax sub-cylindrical, a little longer than broad, feebly rounded and unarmed at the sides, and very slightly constricted at the base. Scutellum forming a nearly equilateral triangle. Elytra slightly

and gradually narrowed posteriorly; apices obtusely rounded. Femora clavate; the posterior, longer and more gradually thickened, surpassing the elytra behind; first joint of posterior tarsus longer than the two succeeding joints combined. Front coxæ spherical, not angulate on the outside, their cotyloid cavities completely closed behind. Intermediate cotyloid cavities open on the outside. Abdomen with five visible segments, the fifth scarcely as long as the fourth, and rounded at the apex. Female stouter than the male, with the antennæ a little shorter than the body, with the eleventh joint scarcely longer than the tenth, and with joints 7—11 slightly dilated and compressed.

Following Lacordaire's system, this genus must be placed in the *Callichrominæ*, in which group it seems to come nearest to *Ionthodes*. It is easily distinguished from the latter by the form of the prothorax, and by the scape rounded, not angulate, at its inner apical border.

Hypargyra cribripennis, n. s. (Pl. IX., fig. 2, ♂).

Niger, elytris viridis, sub-nitidis, versus suturam purpureo-cyaneis: capite punctato; prothorace foveolato-punctato, vitta utrinque, et vittis duabus obsoletis medio disci argenteo-sericeis; elytris fortiter et creberrime punctatis; pedibus piceis sparsim punctatis, femoribus quatuor anticis rufis; antennis nigris, scapo dense punctato, corpore subtus argenteo-pubescente. Long. 14 and 17; lat. 3½ and 4½ mm., ♂ and ♀.

Hab. Mamboia, Mpwapwa (E. Africa).

Black. Head with a faint silky white pubescence; strongly enough punctured. Prothorax above with close foveolate punctures; with a few small smooth spaces; with a distinct silvery white or fulvous vitta on each side, and two almost obsolete vittæ along the middle of the disk. Elytra of a fine metallic green, passing to purplish blue towards the suture and external margin; covered with very strong and confluent punctures, which give to them a rasp-like appearance. Body underneath with a silvery pubescence, somewhat denser in the female. In the female specimen before me the legs are entirely dark brown, in the male the four anterior femora are red.

The characters of the male have been drawn up from one of two specimens in Mr. Bates's collection; those of the female from a specimen in the British Museum collection.

Compsomera nigricollis, n. s.

Capite fusco-ferrugineo; prothorace nigro, opaco, dense subrugoso punctato; elytris chalybeato-cyaneis, fasciis longitudinalibus a basi ultra medium extensis, nigris; versus basin dense asperato-punctatis, versus apicem minute et subdense granulosis: corpore subtus atro-fusco, leviter griseo-sericeo-pubescente; antennis pedibusque rufo-ferrugineis, femoribus leviter rugoso-punctatis; scapo antennarum scabroso. Long. 27 mm.

Hab. Mamboia (E. Africa).

Head obscure reddish brown, faintly punctured in front. Prothorax dull black, very densely punctured. Elytra of a metallic blue, tinted with violet posteriorly; with two longitudinal black fasciæ on each, and a common triangular black fascia all united at the base; with the outermost or marginal fascia of each elytron broad, dilated posteriorly, and cut away obliquely behind, the inner fascia narrow, attenuated posteriorly, and united at its extremity with the outer fascia. Towards the base the elytra are closely and somewhat asperately punctured, posteriorly the punctures are replaced by minute and dense granules. Body underneath blackish brown, with a faint greyish white pubescence giving silvery reflections in certain lights. Legs and antennæ reddish brown; the femora somewhat rugosely punctured; the scape of the antennæ scabrous.

From the other described species of the genus easily distinguished by having the prothorax almost wholly black.

Mecaspis mina, n. s.

Chalybeato-cyanea, nitida; prothoracis disco glabro, postice sat dense punctulato; scutello modice elongato, transversim rugoso; elytris basi minutissime denseque punctulatis et subtiliter velutinis, deinde glabris nitidis, sparsim punctulatis; corpore subtus chalybeato-cyaneo, nitido; prosterno haud tuberculato; antennis pedibusque nigris, femoribus (basi exceptis) badiis; tarsis supra griseo-pilosis, posterioribus argenteis. Long. 29 mm.

Hab. Sierra Leone.

Deep dark blue, passing in places to violet. Prothorax punctulate and very feebly rugulose on the disk, especially towards the sides posteriorly; the anterior and posterior sulci each with two or three feeble transverse ridges. Elytra with the base very minutely and closely punctulate and covered with a faint velvety pile, the remainder glabrous and sparsely and finely punctured.

Legs black; with the femora, except at their bases, chestnut red. The four anterior femora dentate and strongly enough emarginate on the underside towards their extremity.

Dolichaspis, n. g.

From *Mecaspis* differs by the more elongated and much smoother scutellum; the femora all unarmed underneath; the mesosternal process flat below, somewhat truncate and subvertical in front.

Dolichaspis scutellata, n. s.

Chalybeato-violacea vel viridi-cyanea; prothoracis disco subtiliter atro-velutino; scutello longissimo (5½—6 mm.), minute sparsissimeque punctulato; elytris minutissime creberrimeque punctulatis et tenuiter velutinis, versus apicem glabris et sparsim punctulatis; corpore subtus chalybeato, subnitido; lateribus pectoris abdominisque subtilissime argenteo-sericeis; antennis nigris, dimidium elytrorum paullo excedentibus. Long. 35—36 mm.

Hab. Angola.

Prothorax strongly though somewhat obtusely tubercled on each side; the disk with a faint velvety black pile, with the median line glabrous. Scutellum very long, very sparsely punctulate, and without transverse ridges. Elytra very minutely and closely punctulate on those parts covered by the faint velvety pile; towards the apex and on a narrow space along the middle of each, glabrous and sparsely punctulate. Legs and underside of the body steel blue, sub-nitid; the tarsi above with a shining grey pile. Prosternal process rather broader towards the middle of its length, strongly arched and subvertical behind. Antennæ scarcely differing in the two sexes; reaching to about the apical third of the elytra in the male.

Two specimens, which appear to be male and female, in the Brit. Museum collection. In the male the sixth ventral segment is scarcely visible, and the apex of the fifth is slightly sinuately emarginate; in the female the fifth segment is rounded at the apex.

Hypatium splendidum, n. s.

Aurato-viride, cupreo-micans, nitidissimum; capite fronte sat dense punctato; prothorace disco sparsim punctato et versus latera nonnihil transversim rugoso; elytris concoloribus dense punctatis; pedibus antennisque (clavis femorum 4 anticorum rufo-castaneis

exceptis) nigris, his (♀) dimidium elytrorum vix excedentibus; corpore subtus sub-nitido, subtilissime griseo-pubescente. Long. 19½; lat. 5½ mm.

Hab. Mpwapwa (E. Africa), (*Dr. Kirk*).

Head, prothorax above and elytra of a bright golden green, strongly shining, and, in certain lights, giving reddish coppery reflections. Head rather thickly punctured in front. Prothorax near the anterior margin smooth; with the basal constricted part transversely strigose; with the disk sparsely punctured (more sparsely in the middle), and towards the sides feebly wrinkled; with the medio-lateral tubercles obtuse, and the antero-lateral callosities strongly enough developed. Scutellum somewhat rugosely punctured. Elytra densely punctured, with the punctures somewhat less dense towards the base; apices rounded. Body underneath sub-nitid, with a faint greyish pubescence. Legs and antennæ black, with the thickened clavate portion of the four anterior femora reddish chestnut. All the femora provided with a tooth on the underside a little before the apex.

A second specimen, also a female, and of somewhat greater size (length 22 mm.), differs in colour only from the description given. In this specimen not a trace of green is visible; those parts which in the first specimen are golden green are here entirely of a coppery purple. Finding not the slightest difference in structural character to accompany this rather marked difference of colour, I am obliged to regard both specimens as specifically the same.

Philematium nitidipenne, n. s.

♀. Æneo-viride, nitidissimum; capite dense sub-rugoso punctato; prothorace dorso inæquali, transversim rugoso et inter rugas dense fortiterque punctato; scutello brevi, triangulari, sub-rugoso; elytris valde denseque punctatis, punctis postice minutioribus et sparsioribus; pedibus antennisque nigris (clavis femorum anticorum intermediorumque rufo-castaneis exceptis), tarsis supra griseo-pubescentibus. Long. 28 mm.

Hab. Nyassa (*Thelwall*).

Bright brassy green, strongly shining. Head thickly and somewhat rugosely punctured, with a small space on the vertex between the eyes almost impunctate. Prothorax with the posterior raised portion of the disk transversely rugose, with the intervals between the ridges strongly and densely punctured, with the anterior raised

portion of the disk less densely punctured and without ridges. Elytra thickly and strongly punctured, with the punctures gradually becoming smaller and sparser posteriorly. Body underneath brassy green, impubescent, scarcely punctured; abdomen with a golden tinge. Legs black, with the clubs of the four anterior femora reddish chestnut. The tarsi above with a greyish pubescence, which on the posterior tarsi is silvery. Prosternal process feebly obtusely tubercled and subvertical behind. Antennæ black, shorter than the body.

A single female example in the collection. The species is easily distinguished by the peculiar punctuation of its elytra. In no other species of the genus do we find the punctures anteriorly so strong, and posteriorly so sparse. The shortness of the antennæ (in the female) is also a very distinct character.

Callichroma fuligineum, n. s.
= *Callichroma abyssinicum*, Chev. MS.

Nigrum, subtus sub-æneum; antennis chalybeatis, articulis 3—6 interdum rufis; pedibus rufis, chalybeato-tinctis; capite rugoso-punctato; prothorace dorso regulariter et transversim strigoso; elytris opacis, nigro-fusco tenuiter velutinis; antennarum articulo 4o quam 3o vix breviori. Long. 15—23 mm.

Hab. Abyssinia and W. Africa ?.

Prothorax regular, armed on each side with a sharp conical spine, the disc nude, sub-nitid, crossed by fine ridges running into each other, and all with a fairly regular transverse direction. Elytra dull, with a brownish black faint pubescence. Antennæ steel-blue, with sometimes the joints 3—6 reddish; with the fourth joint as long as (♂), or scarcely shorter than (♀), the third.

A species easily recognised by the regular transverse ridges on the whole of the upper side of the prothorax, and the dull brownish black colour of the elytra. Its structure brings it nearest, perhaps, to the North Indian *C. perlætum*, white. There are fourteen specimens in the Brit. Museum collection. Two specimens in Mr. Bates's collection are ticketed W. Africa, but Mr. Bates considers the correctness of this locality open to question.

Hexarrhopala (*Cleomeninæ*), n. g.

Head deeply enough concave between the antennal tubercles. Front declivous. Muzzle short. Eyes finely facetted, emarginate,

lower lobes somewhat rounded, upper lobes small, narrow. Antennæ (♀ ?) attaining the middle of the elytra; scape short, little thickened, joint 3 equal to 4 and 5 united, the rest gradually decreasing in length, joints 5—11 slightly dilated, 6th and 7th broadest. Prothorax cylindrical, longer than broad, with the sides nearly parallel, unarmed, very slightly constricted at the base; with a carina, strongly raised posteriorly, along the middle of the disk. Elytra with the sides nearly parallel; strongly punctured; apices broadly conjointly rounded. Femora pedunculate at the base, abruptly swollen into a short thick club at the apex. Abdomen with the first segment as long as the three following united. Sternal processes simple. Anterior cotyloid cavities closed in behind; the intermediate shut off from the mesothoracic epimera by the production forward of the antero-lateral lobes of the metasternum. The body, legs, and basal joints of the antennæ provided with long scattered hairs.

There can be no doubt that the place of this genus is in the group *Cleomeninæ*, from the other genera of which, it is, however, sufficiently distinct. It comes nearest, perhaps, to *Apiogaster*.

Hexarrhopala apicalis, n. s. (Pl. IX., figs. 3 and 3*a*).

Nitida, sparsim ciliata; capite antennisque et corpore subtus nigris; prothorace supra rufo-testaceo, marginibus anticis posticisque nigris, disco sparsim punctato et in medio longitudinaliter carinato, carina postice valde elevata; elytris brunneo-testaceis, tertia parte apicali violacea, grosse sub-rugosoque punctatis, apicibus conjunctim late rotundatis; corpore subtus sparsim punctato; pedibus nigrescentibus, clavis femorum 4 anteriorum rufo-testaceis. Long. 12; lat. 3 mm.

Hab. Lake Nyassa (*Thelwall*).

The fronts of the four anterior tibiæ with a silky fulvous pile, the rest of the body almost destitute of pubescence beyond the rather long widely scattered cilia coming off from all parts. The four basal joints of the antennæ nitid and somewhat sparsely punctured, the remaining joints with a dull brownish black tomentum. The tibiæ carinate, with the intervals between the carinæ punctured.

The coloration of this species is extremely like that of the following little species which I am obliged to refer to *Apiogaster*.

Apiogaster similis, n. s.

Nigra, nitida, sparsim ciliata; prothorace in medio disci laterumque, elytris (sutura antice et tertia parte apicali, nigris, exceptis) et clavis femorum rufo-testaceis; capite subnitido, dense punctato; elytris sparsim punctatis, apicibus leviter sinuato-truncatis; antennis dimidium elytrorum vix excedentibus, scapo valde punctato et versus apicem breviter transversimque carinato. Long. 5; lat. $1\frac{1}{2}$ mm.

Hab. Lake Nyassa.

The prothorax across the middle above, and a broad vitta of each elytron extending from the shoulder near to the apical third, and there invading the whole width of the elytron, reddish testaceous; the clubs of the femora of the same colour; the rest of the body black.

In the sinuation of the lateral margins, and the enlargement behind of the elytra, in the form and punctuation of the head, in the width and strong punctuation of the metathoracic episterna, and in other characters, this species agrees with *A. rufirentris*, Perroud. It differs in colour, in the rougher scape, which bears two short transverse ridges on the inner side at the apex, in the stronger punctuation of the elytra, and in having the basal segment of the abdomen relatively shorter.

LAMIIDÆ.

Stixis, n. g. (*Lamiinæ veræ*).

Head broadly and slightly concave between the antennal tubercles; front slightly convex, a little broader than high. Eyes emarginate, with the lower lobes rather short and oblique. Antennæ (♀) about as long as the body, with the scape reaching to about the middle of the prothorax, narrowly cicatrised at the apex, the cicatrix limited by a complete carina, with the third joint about equal in length to the scape, the fourth much shorter, the rest decreasing gradually. Prothorax broader than long, armed with a sharp spine on each side just behind the middle, strongly punctured above. Elytra much broader than the base of the prothorax, very strongly punctured, gradually rounded on the sides at the middle, strongly retracted towards the apex, where each is emarginate with the outer angle produced into a short blunt spine. Legs moderately long, with the femora somewhat thickened beyond the middle; with the intermediate tibiæ emarginate; with the claws of the tarsi divaricate. Prosternal process simple, arched in the middle: mesosternal process subvertical in front. Metasternum very short.

Two characters—the presence of a closed cicatrix on the scape of the antennæ, and the shortness of the metasternum—fix the position of this genus in Lacordaire's group *Lamiinæ veræ*. From *Velleda*, which it seems to approach most nearly, it differs chiefly by the broader front of the head; the shorter and more transverse prothorax, with the lateral spines slightly recurved and placed just behind the middle; the elytra much more strongly punctured; and the femora not carinate on each side below.

Stixis punctata, n. s.

Niger; capitis vertice et prothoracis dorso valde punctatis, et tenuiter griseo-pubescentibus; scutello griseo; elytris punctatis, punctis magnis, oblongis, sub-seriatim dispositis, singulis plaga triangulari laterali et fascia preapicali cinereis, apicibus emarginatis, angulis externis breviter spinosis; corpore subtus pedibusque tenuissime griseo-pubescentibus. Long. 10; lat. 3½ mm.

Hab. Mpwapwa (E. Africa), ♀.

Front of the head with a few minute scattered punctures; the vertex rather strongly and sparsely punctured. Prothorax above rather densely punctured with deep strong punctures. Elytra with large oblong punctures arranged somewhat in rows, with the punctures at the base slightly asperate.

Idactus spinipennis, n. s.

Fulvo-brunneo-pubescens; capitis vertice macula arcuata nigro-velutina; prothoracis disco trituberculato, in medio fusco-liturato; elytris basi asperatis, singulis prope basin crista sub-elongata fasciculoque pilorum et postice fasciculis pilorum tribus; apicibus sub-attenuatis et ad suturam spina obtusa brevi armatis; lateribus et disco inter cristas fusco-plagiatis; antennis corpore paullo longioribus, scapo crasso, obconico, apice intus asperato-cicatricoso, cicatrice sine carina, articulo 3o quam 4o sesqui-longiori; femoribus in medio incrassatis, tarsis anticis sub-dilatatis, et lateraliter sparsim fimbriatis. Long. 20; lat. 7½ mm.

Hab. Banks of the Anseba River (Abyssinia).

Eyes with the lower lobes rather large. Prothorax with a strong and sharp tubercle on each side, and three tubercles on the disk, of which the median is a little stronger than the two anterior. Elytra somewhat asperate at the base, each with a slightly elongate crest, surmounted by a fascicle of hairs, on the middle of the disk near

the base, with a small tuft of hairs external to this crest, with three tufts of hairs posteriorly placed near the inner border of the postero-lateral fuscous patch. The apices somewhat attenuated, and each ending at the suture in a short blunt spine. The prosternal process slightly arched, and sending out a small angular process against the coxa on each side just at the commencement of the posterior declivity. The mesosternal process flat, and sending out a similar process on each side a little before its posterior extremity.

Idactus Ellioti, n. s.

Fulvo-griseo-pubescens; capitis vertice macula arcuata nigro-velutina; prothoracis dorso in medio et lateribus pone tuberculos suf-fuscis, disco tri-tuberculato, tuberculo medio valde elevato, conico; scutello fusco, linea media fulva excepta; elytris basi fortiter punctatis, griseo-pubescentibus, plaga magna elongata utrinque fusca, supra in medio triangulariter valdeque emarginata; singulis prope basin crista fasciculoque pilorum, et postice fasciculis pilorum tribus; apicibus sub-oblique truncatis; antennis corpore paullo longioribus, scapo clavato ad apicem punctis paucis asperatis, articulo 3o quam 4o fere sesqui-longiori. Long. 17; lat. 6½ mm.

Hab. Madagascar (*G. F. Scott Elliot*).

This has a strong general resemblance and a somewhat similar style of marking to the preceding. It differs, however, by the more clavate scape of the antennæ, the stronger median tubercle on the disk of the prothorax, the base of the elytra strongly punctured and less distinctly asperate, the apices somewhat obliquely truncate and without a spine at the suture. The sternal processes are somewhat similar in structure, and the anterior tarsi are slightly dilated and fringed. The eyes in this species are smaller than in the last, and are relatively of about the same size as in *I. tridens*, Pasc.

Idactus maculicornis, n. s.

Brunneo-pubescens, fusco variegatus, capitis vertice macula arcuata nigro-velutina; prothorace lateraliter et in medio disci nigro-velutino-sub-maculato; scutello fusco; elytris fasciculis minutis pilorum dispersis, singulis prope basin tuberculo fasciculoso, apicibus rotundatis; antennis (♀) corpore vix longioribus, griseo pubescentibus fusco-maculatis, scapo sub-clavato, apice intus asperato, articulo 3o quam 4o paullo longiori; segmento ultimo dorsali abdominis fasciculis duabus pilorum fulvorum.

Hab. Mombas, E. Africa.

In style of marking and colour resembles the two preceding, especially the first, but the postero-lateral fuscous patch of each elytron is more broken up into line-like spots, which enclose two whitish spots. The present species is very distinct by the numerous very small tufts on the elytra, by the fasciculose tubercle instead of an elongated crest on each near the base, and by the apices of the elytra rounded off to the suture, and not furnished with a spine. The sternal processes have a structure similar to that in the two last species, and in *I. tridens*. The eyes are small.

Notwithstanding the marked structural differences between the three species just described, I feel compelled to place them in the same genus. Beyond having a longer third joint to the antennæ, they differ in no essential respect from *Idactus tridens*. I agree with Mr. Pascoe that the genera *Idactus* and *Oeax* are best placed near *Lasiopezus*. *Oeax*, in Gemminger's catalogue, is, without reason, placed as a synonym of *Acmocera*; so also is *Emphreus*—a very distinct genus which should, I think, be placed in the group *Baræinæ* near *Stenobia*. Judging from the description, (*Baræus*) *Sundewallii*, Fähr., must be extremely closely allied to, if not identical with, *Emphreus ferruginosus*, White.

Prosopocera antennata, n. s.

♀. Griseo-pubescens, elytris pallide brunneo irroratis, singulisque pone humerum macula parva laterali nigro-velutina; pronoto antice rotundato, basi bisinuato, disco medio leviter inæquali, tuberculis lateralibus prothoracis sat validis, apice subobtusis; elytris humeris minute granulatis deinde sparsim punctulatis; antennis corpore vix æqualibus, articulo tertio quam scapo breviori. Long. 27; lat. 11 mm.

Hab. Yoruba (W. Africa), (*Capt. Moloney*).

Head with the front in its upper part flat or slightly concave, in its lower part somewhat convex, with a raised median line extending from base to vertex, with a transverse impressed line between the eyes above the antennal tubercles, and with two oblique nude lines on the basal part of the front. Eyes of moderate size, their lower lobes reaching a little more than half-way to the base of the mandibles. Pronotum with its front margin rounded, its basal margin bisinuate; with four transverse impressions, two of which, close to

the margins, are less distinct; of the remaining two that near the base is almost perfectly straight, while the anterior groove is very strongly bisinuate; disk somewhat uneven. Elytra with a grey pubescence mottled with pale brown; with some small granules on the base and shoulders, from thence very sparsely punctulate; each with a small velvety black spot placed close to the margin behind the shoulder. Body underneath and legs with a yellowish grey pubescence. Antennæ grey, with the third joint a little shorter than the scape, the fourth barely longer than the third, the fifth and following joints subequal.

In the Museum collection there are two specimens—one from Sierra Leone, the other from Old Calabar—which agree in the relative length of the third joint of the antennæ and other structural characters with the specimen just described, but differ by having two black spots (placed obliquely) on each elytron instead of one. For the present I regard these as forming a variety.

The three following species form a separate section in the genus *Prosopocera* characterised by having the horn of the head in the male coming off from the base of the front, and directed slightly upwards instead of downwards, and by having the two intermediate of the four transverse grooves of the prothorax almost directly transverse and parallel, instead of being more or less strongly bisinuate. The prothorax itself is proportionately somewhat shorter, with the pronotum less produced and less rounded in front.

Prosopocera aspersa, n. s.
Prosopocera schüppelii. Dej. Cat.

Picea vel rufo-picea; capitis fronte (♂) in medio excavata, cornu supra concavo subtus convexo, apice bifido; prothorace lateribus obtuse breviterque tuberculato, supra in medio et lateraliter albido-pubescente; elytris sparsim punctatis, maculis numerosis minimis aspersis, singulisque maculis quatuor majoribus (una basali, duabus ante medium oblique positis, quarta ad tertiam apicalem) albido-pubescentibus; antennis (♂) articulis tertio ad quintum incrassatis. Long. 18—22mm.

Hab. Cape of Good Hope.

Head in the male with an oval excavation in the front just above the horn, the latter also hollowed out at its base on the upper side. Lower lobes of the eyes not reaching quite half-way to the base of the mandibles; with a white spot behind the lower

lobe of each eye, and a few faint whitish lines on the front of the head. Prothorax with rather short and obtuse lateral tubercles vaguely pubescent on the middle of the disk, more distinctly pubescent on the sides. Elytra with numerous very small scattered white spots, and each with four larger whitish spots, of which one is at the base; two, the largest, are placed obliquely towards the side in front of the middle, and each encloses a nude spot; the fourth is at about the beginning of the apical third. Sides of the body underneath whitish. Legs and antennæ with a faint greyish pubescence.

Prosopocera cornifrons (Dej. Cat.), n. s.

Olivaceo-brunnea leviter griseo-pubescens; capitis fronte (♂) cornu armata, cornu apice bifido; prothorace lateribus sat valde obtuseque tuberculato; elytris sub-sparsim punctatis leviter griseo-pubescentibus maculis aspersis fulvido-albidis; antennis (♂) articulis tertio quartoque incrassatis; corpore subtus lateribus fulvido-pubescentibus. Long. 18—20 mm.

Hab. Senegal.

Head with the horn in the male concave above and bifid at the apex; with the front above the horn not excavated. Prothorax strongly enough tubercled at the sides, with the tubercles blunt at their apex. Elytra somewhat sparsely punctured; with a faint greyish pubescence, and with some small scattered, and a few larger somewhat obscure, fulvous white spots. Antennæ in the male not quite twice as long as the body, with the third and fourth joints thickened; with the joints from the fourth ringed with fuscous at their apices, for the rest greyish-pubescent.

Prosopocera Dejeani, n. s.
Prosopocera senegalensis, Dej. Cat.

Piceo-fusca, leviter et vage griseo-pubescens; capitis fronte (♂) cornu armata, cornu apice bifido; prothorace lateribus sat valde tuberculato, tuberculis apice obtusis et lateraliter sub-compressis; elytris valde punctatis, griseo vel albido vage pubescentibus; antennis articulis tertio quartoque (♂) incrassatis. Long. 20—25 mm.

Hab. Natal.

Pitchy brown. Head feebly rugosely punctured in front, with a whitish pubescence around the eyes, with the horn in the male bifid at the apex. Prothorax strongly enough tubercled at the sides, with the tubercles blunt at the apex and slightly compressed from before backwards. Elytra rather strongly punctured, with

a somewhat mixed pubescence of light grey and brownish grey, with one or two lighter coloured spots towards the sides anteriorly. Antennæ about half as long again as the body, with the third and fourth joints in the male thickened, with the joints from the fourth fuscous at their apices.

There are five specimens of this species in the Brit. Museum collection, but all in a more or less rubbed condition, so that I have not been able to satisfactorily describe the nature of the pubescence. The species seems to be closely allied to the last, from which it differs by its larger size, its much darker-coloured derm, its somewhat more strongly tubercled prothorax, and finally by having its pubescence pale grey or whitish, where in the other species it is fulvous.

Alphitopola octomaculata, n. s.

Rufo-brunnea, griseo-pubescens; capite partim, prothorace antice et vitta marginali elytrorum rufo-ferrugineo-pubescentibus; prothorace utrinque macula parva nigra; elytris singulis maculis tribus nigris—una humerali, secunda laterali, pone humerum, tertia dorsali, paullo ante medium. Long. 14 mm.

Hab. Lake Nyassa (*Thelwall*).

Head with a pubescence partly grey, but mostly of a reddish rust colour. The front with a median raised line, the vertex with a transversely arcuate linear impression. Prothorax reddish pubescent in front of the middle, greyish pubescent behind the middle; the sides slightly rounded in the middle, each with a small rounded black spot. Elytra strongly and thickly enough punctured, with the punctures almost concealed by the close fawn-coloured pubescence; with a marginal reddish rust-coloured band, and each with three black spots, one above the shoulder basal, one below and a little behind the shoulder, the third on the disk a little in front of the middle; apices of the elytra rounded. Body underneath and legs with a greyish pubescence; the middle of the breast and of the abdomen pink-tinted owing to the red colour of the derm underneath. Last abdominal segment (♂) with a deep triangular emargination at the apex. Mesosternal process very feebly tubercled near its posterior end. Antennæ greyish-pubescent, a little longer than the body.

Alphitopola vitticollis, n. s.

Fulvo-brunneo-pubescens; capite linea mediana, elevata, nigra; prothorace vittis tribus niveis (vittis lateralibus ad oculos extensis);

scutello, macula ovali pone scutellum, et macula subovali (antice nigro-notata) singulo elytro ad medium niveis; elytris valde punctatis, apicibus rotundatis; corpore subtus brunneo, pectore utrinque niveo-vittato; antennis fusco-ferrugineis tenuiter griseo-pubescentibus. Long. 13; lat. 4 mm.

Hab. L. Nyassa (*Thelwall*).

With a fulvous brown pubescence. Head with a longitudinal median raised black line; with an arcuate linear impression between the antennal tubercles; with the eyes large; with the palpi testaceous. Prothorax unarmed and slightly rounded at the sides; transversely grooved near the base and apex; with a median dorsal vitta, and a broader vitta on each side snow-white; the lateral vittæ produced to the eyes in front, and along the sides of the breast behind. Scutellum and an oval sutural spot adjoining it, snow-white. Each elytron, just in front of the middle, with an oval snow-white spot which is marked at its anterior end with a small round black spot; with a similar black spot at the side of each elytron behind and below the shoulder. Apices of the elytra rounded. Mesosternal process strongly tubercled. Antennæ reddish brown, with a faint greyish pubescence.

Alphitopola Pascoei, n. s. (Pl. IX., fig. 4).

Pallide-brunnea, tenuissime griseo-pubescens; capite antice luteo-flavo-pubescente, linea mediana longitudinali elevata; prothorace medio disci sub-nitido, lateribus singulis vitta lutea, nigro-unipunctata; elytris valde punctatis, maculis tribus basalibus (una communi pone scutellum), fasciaque obliqua nigro-bipunctata utrinque ante medium, et macula utrinque versus apicem, luteis; apicibus rotundatis; pedibus antennisque brunneis. Long. 12 mm.

Hab. L. Nyassa (*Thelwall*).

Head with a buff yellow pubescence in front, with a raised longitudinal median black line, with an arcuate linear impression between the antennal tubercles. Prothorax unarmed and slightly rounded in the middle at the sides, with a transverse groove towards base and apex, each side with a luteous vitta marked near its middle with a minute black spot. Elytra strongly and somewhat sparsely punctured; with three luteous spots at the base—one behind and one on each side of the scutellum—of which the two lateral are each terminated anteriorly by a small black point; with, on each before its middle, an oblique luteous fascia extending from the margin inwards and backwards without reaching the suture, and marked with two small round black spots, one near its

lateral, the other near its inner end; with a luteous spot on each towards the apex; with the apices rounded. Mesosternum with a small conical tubercle. Legs and antennæ pale brown.

Phymasterna maculifrons, n. s.

P. lacteoguttatæ similis; indumento atro-fuliginoso vestita; albo-maculata; capite maculis sex—una vertice, una medio frontis, una singula gena, et una utrinque pone oculos; prothorace plaga alba utrinque; scutello albo-maculato; elytris maculis quinque et punctis duabus albis; antennis nigris, opacis. Long. 9—15 mm.

Hab. Madagascar.

Covered with a dull brownish black indumentum above, and with a greyish pubescence underneath. Head with a white spot on the vertex, a spot on the middle of the front, a transverse spot on each cheek, and a small rounded spot behind each eye. Prothorax with a white plaga on each side. Scutellum with a white spot. Elytra sparsely punctured, with the punctures concealed by the somewhat scaly pubescence; each with two points, one above, one below the shoulder, and five more or less rounded spots, white; of these spots the first is near the suture, and at a short distance behind the scutellum; the third, the smallest, is in a line with the first; the second, a little larger than the first, is on the side close to the outer margin; the fourth and fifth are placed, one behind the other, on the posterior half of the elytron, the fourth spot being the largest of all. Body underneath with a white spot on each side of the prothorax in front of the outer angle of the cotyloid cavity, a spot on each side of the mesothorax, a large oblong spot on each side of the metasternum, and a spot on each side of each of the first four abdominal segments.

From *P. lacteoguttata*, Casteln., differs by its somewhat narrower form, its much blacker indumentum, the white spots on the front and sides of head, and on the sides of the pro- and meso-thorax underneath, the scutellum with a white spot, and the spots on the elytra of relatively somewhat different sizes, with the first spot farther back from the scutellum.

Phymasterna obscura, n. s.

Piceo-fusca, griseo-pubescens; capitis fronte linea mediana elevata, vertice arcuato-impressa; prothorace obscure-fulvo-quadrivittato; elytris punctatis, griseo fulvoque pubescentibus; antennis griseo-pubescentibus, corpore duplo longioribus (♂), corpore paullo

longioribus (♀), articulo tertio quam quarto distincte longiori. Long. 14; lat. 5½ mm.

Hab. Angola.

Head impunctate, with the front a little longer than broad, with a median raised line from base to vertex, the latter with a ∩-shaped impression. Prothorax almost impunctate, with the sides obtusely angulate in the middle; grey, with two fulvous vittæ along the disk, and one, broader, on each side enclosing one or two grey spots. Elytra punctured; with a lead-grey pubescence, interspersed with tawny; apices rounded. Body underneath and legs with a rather thin grey pubescence. Antennæ greyish pubescent, with the third joint distinctly longer than the fourth.

Plectroscapus (*Barœinæ*), n. g.

Head deeply and triangularly concave between the antennal tubercles; these very prominent and separated by a narrow channel at their base; front nearly flat, indistinctly marked off from the epistome, the latter with its inferior margin tri-sinuate. Eyes moderately large. Antennæ much shorter than the body: with the scape stout and somewhat deformed, narrow at the base, and prolonged at the apex on the dorsal side into a rather strong and sharp recurved spine; third joint shorter than the scape, nodulose externally at the apex; fourth joint a little longer than the third, thickened towards the apex; fifth and following joints subequal, fitting closely into each other, and of nearly uniform thickness throughout, with the exception of the last joint which narrows towards the apex. Prothorax about as long as it is broad in front, but shorter than its width at the base; provided on the middle of each side with a sharp and stout conical tubercle; and on the disk anteriorly with two very small and widely separated tubercles. Elytra with the shoulders each projecting forwards in an obtuse conical process; with a large obtuse hump or swelling on the disk of each elytron behind the base, with a feeble depression behind the hump; apices obliquely truncate, with the sutural angles dentate. Legs subequal; femora moderately stout, somewhat thickened towards the middle. Intermediate tibiæ deeply notched at about the middle of their length. Claws of the tarsi divergent. Prosternal process feebly arched, very narrow in the middle, widely enough expanded towards the posterior extremity. Mesosternal process rather narrow, gradually attenuated posteriorly, and truncate at its extremity.

This genus seems to be best placed near *Temnoscelis*.

Plectroscapus bimaculatus, n. s. (Pl. IX., fig. 5).

Fuscus, pube breve fulvo-brunnea obtectus; capitis prothoracisque lateribus et articulis basalibus antennarum subtus, cinereis; elytris sparsim punctatis, singulis macula nigro-velutina longe pone medium. Long. 26 mm.; lat. 9½ mm.

Hab. Old Calabar.

Dark brown, with a short fulvous pubescence which, on the elytra, is mixed in places with grey. With the first three joints of the antennæ underneath, the pro- and mesosterna, and the sides of the head and prothorax ashy-grey. Elytra sparsely punctured; each with a distinct velvety black spot placed on a slight prominence at about the posterior fourth. Each of the first four abdominal segments with a small white pubescent spot on each side; the last segment feebly sinuately emarginate at the apex.

The unique specimen of this interesting species is probably a male; and the curious spur on the scape of the antennæ may, perhaps, be a sexual character.

Thylactus insignis, n. s. (Pl. IX., fig. 6).

Fulvo-brunneo dense pubescens; capite supra macula spatulata nigro-velutina; elytris punctatis, dense brunneo-pubescentibus, lineis oblique transversis pallidioribus; singulis medio lateris plaga triangulari nigro-velutina; apicibus externe rotundato-explanatis et breviter nigro-fimbriatis. Long. 32; lat. 10 mm.

Hab. Bathurst (W. Coast of Africa).

Clothed with a thick fulvous brown pubescence, somewhat paler in parts. Head with a distinct velvety black spatulate spot above. Prothorax armed on each side with a strong and sharp tubercle, in front of which is an indistinct pale fulvous and slightly oblique vitta. Elytra, through the thick brownish pubescence, appearing finely and sparsely punctured; with a paler pubescence forming on each three oblique lines, of which one from behind and below the shoulder curves upwards and backwards on to the disk, the remaining two, straight and almost directly transverse, placed one behind the other on the posterior fourth; with a triangular velvety black plaga at the margin on the middle of each side; apices somewhat truncate near the suture, externally broadly rounded, slightly dilated and fringed with short black hairs. Antennæ with a greyish brown pubescence, with the scape somewhat fuscous underneath.

This species is more robust and more thickly pubes-

cent than *T. longipennis*, Pasc., and is distinguished further by the spatulate black spot on the head, the pale transverse lines on the elytra, the black spots at the sides triangular in form, and the apices of the elytra more rounded externally.

Psathyrus longipennis, n. s.

Brunneo-ferrugineus, tenuiter fulvo-pubescens; prothorace cylindrico, latitudine vix longiore, minutissime et crebre punctulatis; elytris elongatis, fulvo-brunneis, minute denseque punctulatis, singulisque lineis duabus longitudinalibus elevatis, apicibus acuminato-rotundatis; femoribus compressis; antennis longissimis, scapo brevi, crasso, ad apicem cicatricoso, cicatrice transversim rugosa, articulis a tertio sub-asperatis. Long. 19 mm.

Hab. Madagascar.

Head with the front rectangular and divided by a deep median groove. Eyes with the lower lobes somewhat rounded, with the upper lobes sub-approximate above. Prothorax scarcely longer than broad, and not narrowed in front. Elytra very long, with two feebly raised lines on the disk of each. Femora compressed, narrowed to a knife-like edge on the upper side, and rounded below; with the anterior femora shorter and deeper, and concave in front. Antennæ very long, with the scape rather short and thick, and provided with a transversely rugose cicatrice at the apex; the cicatrice limited by an incomplete but distinct carina, external to which is a second shorter carina enclosing a small depression.

This species differs from *P. aspericornis*, Chev.,—the type of the genus, and the only known species,—by its shorter and somewhat differently shaped prothorax, by its much longer elytra, and by its eyes more approximate above. It agrees with it in the form of its head and eyes, in the structure of its cotyloid cavities, and in other important respects. The cicatrice of the scape bears the closest resemblance in the two species, and is of a kind quite peculiar to this genus, though no mention of it is made by either Thomson or Lacordaire.

Docus, n. g.

♂. Head moderately retracted, concave between the antennal tubercles, with the latter sub-prominent, with the front rectangular. Eyes emarginate, their lower lobes sub-ovate, reaching scarcely

half-way to the base of the mandibles. Antennæ a little longer than the body, with the scape rather stout, elongate, reaching beyond the middle of the prothorax, with the third joint scarcely as long as the scape, with the fourth and following joints gradually diminishing in length. Prothorax sub-cylindrical, as long as broad, armed with a strong tubercle on each side just behind the middle. Elytra much broader than the prothorax, slightly and gradually narrowed up to their posterior third, and from thence more abruptly narrowed to the apex. Legs of moderate length, with the femora very stout and fusiform, the posterior a little longer and stouter than the anterior. Intermediate tibiæ entire. Claws of the tarsi divergent. Sternal processes simple, very feebly arched. Intermediate cotyloid cavities open on the outside.

This genus must, I think, be placed near *Planodema* in Lacordaire's group *Theocrinæ*. Its unique species has somewhat the appearance of a *Monohammus*, but is easily distinguished by its long scape destitute of a cicatrice, its stout fusiform femora, its divergent claws and entire intermediate tibiæ.

Docus femoratus, n. s. (Pl. IX., fig. 7).

Griseo-brunneo pubescens; prothorace supra vittis tribus obscuris fulvis; elytris punctatis, singulis plaga obliqua pone medium et maculis nonnullis dispersis cinereis, apicibus rotundatis. Long. 17; lat. 5½ mm.

Hab. *Masai* (*H. C. V. Hunter, Esq.*).

With a greyish or yellowish brown pubescence. Head and prothorax impunctate; the latter with a few minute glossy granules on the disk, and with three rather obscure longitudinal fulvous vittæ. Scutellum fulvous. Elytra densely enough punctured, brownish pubescent, with a small black spot on each side of the scutellum, and each with an oblique ashy patch at about the middle, as well as some small scattered spots of the same colour; apices rounded. Body underneath and legs with a nearly uniform fulvous brown pubescence, with a minute whitish spot on each side of each of the first four abdominal segments. Antennæ with the joints from the third fuscous at their apex, pale grey at their base.

Eumimetes johannæ, n. s.

Olivaceus, griseo-fulvo-pubescens; prothorace dorso in medio valde et subasperato punctato; elytris valde punctatis, pube pallide fulva passim densiore, et ferrugineo-brunnea mixta; corpore subtus

pedibusque æqualiter pubescentibus; antennis griseis, articulis a tertio apicibus fuscis. Long. 16; lat. 7 mm.

Hab. I. of Johanna.

Derm olive-green, clothed with a dense pale fulvous pubescence. Head very sparsely punctured with the punctures almost entirely concealed by the pubescence. Prothorax with the pubescence thick and uniform in front and behind, and interrupted across the middle of the disk by numerous strong and somewhat asperate punctures. Scutellum transverse, truncate behind. Elytra strongly and rather thickly punctured, with the punctures stronger and somewhat asperate towards the base; with the pale fulvous pubescence, owing to the somewhat irregular distribution of the punctures, denser in some places than others; with three or four very obscure rust-brown spots or bands on each elytron. Body underneath and legs with a nearly uniform fulvous grey pubescence. Antennæ scarcely longer than the body (♂).

This species has the size and general form of *E. sparsus*, Klug., with the sides of the prothorax a little more strongly tubercled. It may be easily distinguished by its difference of colour and punctuation.

Soridus, n. g.

Head broadly and slightly concave between the antennal tubercles; front transverse; eyes subdivided, lower lobes small. Antennæ a little longer than the body, with the scape rather short and stout, the remaining joints slender, with joints 3 and 4 subequal, each much longer than the scape; the fifth a little longer than the scape, the rest slightly and gradually decreasing in length. Prothorax longer than broad, unarmed at the sides, with its greatest width at about the anterior third, and from thence gradually narrowed anteriorly and posteriorly; with the pronotum produced and rounded in front. Elytra at the base a little broader than the prothorax; posteriorly scarcely narrowed; broadly sub-truncate at the apex. Intermediate tibiæ entire; claws of the tarsi divergent. Prosternal process simple, rather narrow in front, dilated posteriorly. Mesosternal process with an obtuse tubercle near the middle of its length. Anterior cotyloid cavities placed far enough back from the anterior border of the prothorax, slightly angulate on the outside. Intermediate cotyloid cavities open on the outside.

The species on which this genus is founded must be withdrawn from *Xylorrhiza* to which it has little resem-

blance, and from which it differs by distinct structural characters. The genus seems to have no near affinities, but it will be best placed, I think, in Lacordaire's Section A, of the group *Niphoninæ*. The anterior coxal cavities are separated from the front border of the prosternum by a longer interval than is the rule in this group.

Soridus biapicatus, Chev.

Xylorrhiza biapicata, Chev., Rev. et Mag. de Zool., 1857, p. 82.

Chevrolat has described the prothorax as at least twice as long as broad, but in this he erred, for I find, on measurement, that it is not quite half as long again as the width at the base.

STATHMODERA, n. g.

Head concave between the antennal tubercles; the latter slightly prominent, with their anterior apical border entire; front higher than broad, with its lateral borders almost parallel. Antennæ a little longer than the body, sparsely setose underneath; with the scape rather stout, this and joints 3 and 4 subequal, the rest gradually decreasing in length. Prothorax slightly rounded at the sides; unarmed; marked above with deeply impressed longitudinal lines. Elytra strongly and serially punctured; retracted posteriorly; with the apices narrowly truncate, and each armed at the outer angle with a very strong spine. Femora sub-clavate; the posterior not surpassing the fourth abdominal segment; intermediate tibiæ emarginate; claws of the tarsi divergent; the two basal joints of all the tarsi marked with a feeble longitudinal dorsal groove, and armed above at their distal extremity with some slender spines. Intermediate cotyloid cavities closed on the outside. Sternal processes simple.

From the characters of the two small species comprised in this genus, the latter must, I think, be placed in the group *Ptericoptinæ*.

By the twelve longitudinal deeply impressed lines on the pronotum, and the slender spines at the dorsal extremity of the two basal joints of the tarsi, the two species now described may be easily identified.

Stathmodera lineata, n. s. (Pl. IX., fig. 8).

Fuscus; capite, vitta utrinque prothoracis et maculis nonnullis elytrorum fulvo-pubescentibus; prothorace pone apicem et ante

basin transversim bi-impresso; dorso lineis longitudinalibus duodecim sat profunde impressis; elytris valde crebreque et seriatim punctatis, punctis sub-oblongis; apicibus angulis externis valde spinosis; pedibus dense punctatis; antennis fuscis, scapo dense punctato. Long. 7; lat. 2½ mm.

Hab. Sierra Leone.

Prothorax above with twelve nearly parallel longitudinal lines, and with four transverse impressions, two near the base and two anteriorly. Elytra with closely approximated rows of very strong and somewhat oblong punctures; with a pubescence almost limited to six or seven fulvous spots on each, four of which are placed obliquely at about the apical third. Abdomen with the posterior border of the first, and spots at the sides of all the segments, fulvous.

Stathmodera aureicornis, n. s.

Prothorace vitta lata fulva utrinque; dorso lineis duodecim longitudinalibus sub-parallelis, lineis transversis anticis obsoletis; elytris minus valde punctatis, lateraliter utrinque uni-carinatis, griseo-pubescentibus, regione suturali antice et fascia obliqua submedia suf-fuscis; antennarum articulis basalibus sub-aurato-pubescentibus. Long. 8; lat. 2½ mm.

Hab. Sierra Leone.

From the preceding differs by the broader fulvous vitta on each side of the prothorax; the longitudinal lines of the pronotum less parallel, the anterior tranverse lines less distinct, the most anterior being almost absent; the elytra with a greyish pubescence, the punctures seen through which appear much smaller and the rows less approximate; the punctures on the less pubescent fuscous region near the suture appearing large enough; each elytron with a slightly sinuate carina beginning a little behind and below the shoulder, and extending to near the base of the external spine. Antennæ with a somewhat golden metallic pubescence on three or four of the basal joints. (In fresh specimens this pubescence would probably be seen to extend to nearly all the joints.)

Amphistylus (*Spalacopsinæ*), n. g.

Differs from *Spalacopsis* by the following characters:—

Head more elongated. Antennæ shorter than the body (♀ ?), destitute of long hairs or cilia, almost glabrous, the basal joints only with a very short close pubescence; the scape not reaching to the anterior border of the prothorax, the third joint distinctly longer than the scape, and nearly three times as long as the fourth

joint, this and the following joints subequal or gradually decreasing in length. Prothorax and elytra equal in width at their bases. Elytra conjointly acuminate at the apex, not in the least divergent.

Type:—*Amphistylus Pauli*, Fairm.

Tetraglenes Pauli, Fairm., Comp. Rend. Ann. Soc. Ent. de Belgique, tom. 28, p. LXXVII.

Spalacopsis Pauli, Fairm., Ann. de la Soc. Ent. de France, 1887, p. 345, pl. 3, fig. 1.

Hab. Zanzibar, Nyassa.

This species is very interesting as carrying to the greatest known extent amongst Longicornia that peculiar modification of the head in which the front forms with the upper side a very acute angle, and in which the eyes are simple and placed far back from the insertion of the antennæ.

In the British Museum collection there is a single specimen from the Nyassa region.

Nupserha Kirki, n. s.

Elongata, flavo-testacea; capitis fronte subtiliter infuscato, vertice nigro-vittato; prothorace lateribus subparallelis, pone apicem et ante basin transversim sulcato, disco nigro-vittato; elytris nigris, lateribus antice et macula pone medium flavo-testaceis, singulis quadri-carinatis (margine et sutura inclusis) intervallis valde et seriatim punctatis, apicibus sub-oblique truncatis, angulis externis acutis, angulis suturalibus dentatis; antennis nigris, corpore fere æqualibus (♂), corpore brevioribus (♀). Long. 18—20 mm.; lat. 4½—5 mm. (♂ ♀).

Hab. Mpwapwa, E. Africa (*Dr. Kirk*).

Head with the front slightly infuscate and strongly and rather closely punctured, with the vertex more sparsely punctured, and with two black vittæ meeting between the eyes. Prothorax strongly and rather sparsely punctured on the middle of the disk, almost impunctate towards the sides; yellowish testaceous, nitid, with two comma-shaped black spots (‘’) on the anterior part of the disk. Elytra black, with the shoulders, the sides anteriorly, and a discal spot on each behind the middle yellowish testaceous; each with two distinct carinæ in addition to the raised sutural and marginal edges; with a single row of punctures between the marginal and infero- lateral carinæ, with two rows of strong punctures between the infero- and supero-lateral carinæ, and with two less distinct rows of smaller punctures between the supero-lateral and sutural

carinæ. Body underneath and legs yellowish testaceous, sub-nitid, and almost impunctate. Antennæ black.

Two specimens, a male and a female, in the collection. The female specimen differs a little in colour from the male. The whole of the front of the head, with the exception of the epistome and labrum, is black, the vertex is wholly black, and there is a very broad black band along the disk of the prothorax from base to apex.

Phytœcia basalis, n. s.

♂. Nigra, tenuiter griseo-pubescens et sparsim setosa, elytris tertia parte basali fulvo-testacea, sub-nitida, femoribus et basi abdominis rufescentibus; capite prothoraceque valde sparseque punctatis, hoc lateraliter rotundato; scutello griseo; elytris sub-seriatim foveolata-punctatis, disco antice convexo postice sub-depresso, apicibus sub-truncatis; antennis corpore vix æqualibus. Long. 22; lat. 6¼ mm.

Hab. Natal.

Black, with a faint greyish pubescence. Head and prothorax sparsely and strongly punctured, the latter rounded at the sides. Elytra with about the basal third yellowish or fulvous-testaceous, and sub-nitid, the remainder black; with the whole provided with large foveolate punctures arranged in fairly regular rows; with the punctures becoming small and very sparse at the apex. Body underneath and legs with a somewhat denser greyish pubescence. Abdomen at the base with a reddish tint. Femora, except at the base, reddish. Claws of the tarsi appendiculate. Antennæ scarcely as long as the body, black, with the first six joints more or less grey.

This species, while very distinct, does not offer characters sufficiently strong to justify its separation into a distinct genus. It differs from the robuster forms of *Phytœcia* by its much stronger punctuation, the appendiculate claws of its tarsi, and its obsoletely grooved intermediate tibiæ. From the genus *Blepisanus*, to which it shows some affinity, it is excluded by the form of its antennæ (not thickened to the apex), by its laterally rounded and somewhat globular prothorax, and by its more convex elytra.

Note.—In referring the (*Lamia*) *ænea* of Parry to the genus *Domitia* of Thomson, I suggested that this species might be identical with either *D. viridipennis*, Chevr., or *D. lupanaria*, Thoms. I have since, through the kindness of Mr. Fry, been enabled to examine the type of *D. ænea*, and I find that it is quite distinct from *D. viridipennis*. A comparison of the two may prove useful.

In *D. ænea* the prothorax is provided with two obtuse and rather feebly raised tubercles on the anterior part of the disk; the elytra are highly polished, brassy black, and each furnished with twelve rows (including the short sutural row) of somewhat feeble punctures; the femora are somewhat reddish brown.

In *D. viridipennis*, the prothorax is without dorsal tubercles, the elytra are highly polished, green, each with twelve rows (including the sutural row) of much stronger punctures. The legs, like the rest of the body and the antennæ, are black with a faint greyish pubescence.

Explanation of Plate IX.

Fig. 1. *Hercodera fasciata.*
2. *Hypargyra cribripennis.*
3. *Hexarrhopala apicalis; 3a*, side view of prothorax.
4. *Alphitopala Pascoei.*
5. *Plectroscapus bimaculatus.*
6. *Thylactus insignis.*
7. *Docus femoratus.*
8. *Stathmodera lineata.*

VIII. *On some moths allied to* Himantopterus, *with description of a new species.* By Henry J. Elwes, F.L.S., F.Z.S., &c.

[Read March 5th, 1890.]

Plate X.

In describing a new species of a family which has puzzled several lepidopterists of much greater experience than myself, I feel that I am attempting a task which is impossible to accomplish fully; but, as any opinions on the classification of Heterocera must be provisional in the existing very confused and imperfect state of our knowledge, I hope that I shall at least lay a better foundation for a study of this group than we have at present.

It seems to me that descriptions of new species which are to be certainly identified by future workers, must be accompanied either by a correct illustration, or by such a comparison with their allies as may enable their distinctive characters to be appreciated. I have found that the difficulty of acquiring a correct knowledge of Lepidoptera is greatly increased by the non-comparative descriptions which are often given, so that it is not surprising that few workers have studied exotic moths, or that still fewer of those who have studied them have done so in a thorough and careful way. The literature is voluminous and scattered, and the difficulty of examining such species as the present is great, and can only be undertaken successfully with the help of a good draughtsman, or when wings denuded of their scales are prepared and mounted in such a way that they can be compared together. Having obtained the assistance of Mr. Frohawk, whose beautiful drawings contribute to make our President's recent monograph of *Tinægeria* a model for other work, I have been able to see points that I could not otherwise have seen, in the very delicate and minute venation which he illustrates.

With regard to the systematic position of these insects, Doubleday, speaking of *Thymara zaida*, says it cannot be far from the *Lithosidæ*. Walker says that they are perhaps most nearly allied to *Psychidæ*.

Westwood places *Himantopterus* with the *Arctiidæ*. Rogenhofer founds upon it a separate family, which he says is nearest to *Syntomidæ* and *Procridæ;* but he does not appear to have seen any of the Indian species.

Moore and Butler agree in placing both *Thymara* and the African species among the *Chalcosiidæ*, and in the British Museum they are arranged between *Aglaope* and *Anomœotes*, Feld., a genus occurring in the Himalaya and Angola.

Dr. Heylaerts, of Breda, who is an authority on *Psychidæ*, writes that *Himantopterus fuscinervis* is by no means a Psychid, but he thinks that Walker has put it in its right place. (It stands in Walker's Catalogue between *Ræselia* and *Arctia*.)

Mr. Snellen, of Rotterdam, who is considered a high authority on Heterocera, and whose Analytical Table of the characters of the European Families of Lepidoptera shows that he has studied them comprehensively, writes to me as follows :—"I have a species allied to *Himantopterus*, namely, *Pedoptila nemopteridia*, Butl. This undoubtedly belongs to the *Zygænina* (the *Chalcosiidæ* do not form a distinct family) as a somewhat abnormal genus, and is allied to *Procris*. The male is sufficient to fix the systematic position, for it has two internal veins in the fore wing, the *Syntomina* have but one, the *Psychina* also one, but this is long and forked, basally in *Oiketicus*, externally in *Psyche* and allied genera."

As, however, the neuration of the hind wing in *Himantopterus* is unknown, and that of *Thymara caudata* and *T. zaida* differ from each other, as well as from my species, I cannot say whether these genera should be kept separate; and if so, to which of them my species should be referred.

The same difficulty exists in the African species, which differ from each other in minute points of neuration, and in consequence have been described by Butler under three different genera; so that we have no less than two subfamilies and five genera existing for a group which consists of only nine supposed species, of which one or two may not be distinct, and only three are known

from sufficiently good specimens of both sexes to enable them to be fully described.

No doubt several others remain at present unknown to us in Africa and Asia; therefore I can only say that at present I see no good grounds for recognising more than two genera, namely, *Himantopterus* or *Thymara*, which will include all the Asiatic forms, and *Doratopteryx*, which will include those from Africa.

Fam. HIMANTOPTERIDÆ.

Himantopteridæ, *Rogenh.*, Sitz. der Zool. Bot. Ges. Wein., xxxiii., p. 23 (1883).

Thymaridæ, *Walk.*, Cat., xxxi., p. 277 (1864), sine descriptione.

Gen. Himantopterus, *Wesmael*, Bull. Acad. Brux., iii., p. 162 (1836); Westwood, Trans. Ent. Soc. Lond., 1877, p. 437, t. x., d 1.

? Thymara, *Doubl.*, Zoologist, i., p. 197 (1843).

Rogenhofer's family is based rather upon the neuration of his genus *Doratopteryx* than upon that of *Himantopterus*, which he does not appear to have seen; and as by the figure he gives of the fore wing *Doratopteryx* has only one free internal vein, whilst both *Himantopterus* and *Thymara* have two, it may be that for those who base their classification to some extent on the number of these veins, the two could not be placed in the same subfamily.

Walker gives no characters for his family *Thymaridæ*, which was created for the only two species apparently known to him, namely, *Thymara zaida*, Doubl., and *T. papilionaria*, Wlk., the latter of which, judging from the type (an imperfect female, which alone represents the species in the British Museum collection, though Walker describes both sexes), is not congeneric with *T. zaida*, as it has, like *Doratopteryx*, only one internal vein in the fore wings.

With regard to the genus *Himantopterus*, it is based on the single female specimen from Java, imperfectly described and figured by Wesmael, which, however, has been better figured by Prof. Westwood in our own Transactions. As I have not seen this type, I can only surmise that the vein which Westwood numbers 3 and calls a rudimental discoidal vein (vena spuria apud

Rogenhofer), is incorrectly figured,* because in all the other species, as in my own, though it is only conspicuous in the outer end of the cell, it really extends to the base of the wing, dividing the cell down the middle, and does not terminate in a free end, as shown by Westwood; and in the drawing of *Thymara zaida* by Doubleday, which in this one particular is, as I have proved by examination of the type, incorrect (*cf.* fig. 10).

Himantopterus? vel *Thymara Dohertyi*, sp. nov.
Plate X., figs. 1, 2, 4, 7, ♂, 3, 5, 6, ♀.

♂. Expands ·75 in. Length of the hind wing, ·70 in.; breadth, ·12.

♀. Expands 1·2 in. Length of the hind wing, 1·1 in.; breadth, ·05.

Length of the body, ♂ ·15 in., ♀ ·12 in. Antennæ, ♂ ·30, ♀ ·25.

Antennæ of the male broadly pectinate, the pectens minutely hairy, black. Antennæ of the female clothed with short spiny hairs, black, yellowish at the base. Head black; neck and thorax covered with coarse dark orange hairs, which also clothe the breast, base of the wings and abdomen; and in the male, are continued down the upper half of the hind wings, where they apparently take the form of scales. The remainder of the wings are apparently devoid of scales, but clothed with black hairs, thickest on the veins and centre of the hind wing, where they are a good deal mixed with the yellow scales on the veins and inner margin. Towards the end of the hind wing in both sexes a few grey or pale yellowish hairs appear. Fringes of both wings consisting of the same black hairs. Eyes prominent and smooth; palpi and tongue invisible. Legs black, slightly hairy, with two minute spurs on the joint of the tibia and tarsus in the hind legs of the male.

I cannot make out the form of the claspers, as they are thickly clothed with hair. The shape of the hind wing varies considerably in the five male specimens, so I have figured two of the most different, but the two female specimens are exactly alike.

Found in the Naga Hills at about 5000 ft. elevation in August by W. Doherty.

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* From a drawing made from the type by Mr. M'Lachlan, which he has kindly lent me since the reading of this paper, I find that this surmise is correct.

Synopsis of the Species allied to Himantopterus.

Himantopterus fuscinervis, Wesmael, Bull. Acad. Brux., iii., p. 162, t. vi., 1, ♀ (1836).

Java.

This specimen remains unique in the Brussels Museum, no other existing, as far as I can learn, in any Dutch or other collection. It resembles *Dohertyi* ♀ very closely in form, but differs considerably in colour.

Thymara zaida. (Pl. X., figs. 8 and 10, ♂).

Thymara zaida, Doubl., Zoologist, i., p. 197, ♂ (1843); said to come from North India (bought of Mr. Lewis James in 1843, *fide* Brit. Mus. Register).

Of this curious species two males only are known to exist, the types in the British Museum, and if they really were taken in India I imagine that some remote part of Assam must be the habitat, as none of the very numerous collections received since 1843 have contained it. My figure was made, with Mr. Butler's permission, from one of the type-specimens.

Thymara caudata. (Pl. X., figs. 9 and 11, ♂).

Thymara caudata, Moore, P. Z. S., 1879, p. 394, t. xxxii., 3, ♂. (Pl. X., figs. 9 and 11).

Mr. Moore's type, which, though described as a male, is, judging by the antennæ (as figured), a female, came from Burmah, but he states that he has also seen a specimen in Mr. Farr's collection, taken by him at Pankabari. This is a rest-house at the foot of the Himalaya, on the old road to Darjeeling, and if the insect really occurs in this locality it is most extraordinary that neither Otto Möller, who resided in the immediate neighbourhood for some years, or any of the numerous native collectors in Sikkim, have ever found it. It differs in the neuration of the hind wing from *Dohertyi*, see fig. 11, which is drawn from a specimen in the British Museum, taken by Mr. Hampson in the Nilgiri Hills. This gentleman informs me that he has taken the insect not uncommonly in the Nilgiris at about 3000 ft. He has never seen it on the wing, but on two occasions has found it settled on a

leaf, and at other times has taken it by beating into an umbrella, in which it lies motionless, or with a slight quivering of the wings. In this species the antennæ agree with those of *Dohertyi* in both sexes, but the hind wings do not vary in form as in my species. Of two female specimens in Mr. Lindsay's collection, one has the abdomen of the same shape as in *Dohertyi*, but tufted with black hairs at the end, whilst the other has a very peculiar round dark woolly tuft attached to it, resembling those seen in the females of *Bombyx neustria* and some other moths. Whether, as Mr. Hampson suggests, this wool is detached after oviposition and used by the female as a covering for the eggs, I am unable to say, but it adds another difficulty to the correct classification of the species, no such appendage existing, as far as I am aware, in any of the *Zygænidæ*, *Chalcosidæ*, or allied genera.

T. papilionaria, Wlk., Cat. Het., xxxi., p. 277, ♂ ♀ (1864).

Described from East Africa; where it was discovered by Horace Waller, preserved in Mr. Walker's collection, which is now in the keeping of the Highgate Grammar School, where I have been unable to see it.

This seems very nearly allied to *Doratopteryx plumigera*, but the upper part of the hind wing is much broader, and there is a large fawn-coloured spot half-way down it. It certainly is more nearly allied to *Doratopteryx* than to *Thymara*, and has, like the former, only one free internal vein. The antennæ appear to agree very well with those of *Himantopterus*. The species is represented in the British Museum by a single imperfect female. As it is impossible to examine this specimen without much risk, it is hoped that it may be figured.

Gen. Doratopteryx, *Rogenhofer*, Sitz. Zool. Bot. Ges. Wien., xxxiii., p. 23 (1883).

? Pedoptila, *Butl.*, Ann. Nat. Hist., 5th ser., vol. xv., p. 341, fig. (1885).

The neuration of *Doratopteryx* differs from that of *Thymara* in having the upper median vein and the lower radial well separated at their origin, whereas in *Thymara*

they are emitted from a short common footstalk. In *Himantopterus* they start from the same point, as also in *Pedoptila*. There is also only one free internal vein instead of two, and in the hind wings *Doratopteryx* is described as having two simple longitudinal veins, whilst *Pedoptila*, according to Butler, has three. I, however, can only see two in the type of *P. nemopteridia*. Rogenhofer says that the venation of *Pedoptila Staudingeri* differs in many points from that of *P. nemopteridia*, as shown in Butler's figure; and the comparison of the two genera by Butler in Ann. Nat. Hist., 5th ser., vol. xvi., p. 51, seems to me to show that there is hardly sufficient difference to separate them.

Doratopteryx afra, Rogenhofer, *l. c.*, p. 24, figs. 1, 2, ♀.

Discovered by Marno between Sadani and Koakiora, near Zanzibar in East Africa. Type in Imperial Museum at Vienna. I have not seen this species.

Doratopteryx plumigera, Butl., Ann. Nat. Hist., 6th ser., vol. i., p. 48, fig. 1 (1888).

Collected by Jackson at the mouth of the River Ozy, East Africa (not anywhere near the mountain Kilimanjaro, as stated in Mr. Butler's description).

Of this there are six more or less broken specimens in the British Museum, which in colour resemble *P. nemopteridia* very closely. The two sexes differ in the antennæ much as *Thymara* does, but the hind wings are not broader in the male than in the female.

It is evidently very near *D. afra*, which I only know by description. The fawn-coloured hairs, however, extend to the end of the cell. I am unable to see clearly the veins in the hind wing, as shown by Mr. Butler. They differ from those shown in his figure of *Pedoptila* as they do from those of *Semioptila*. To enable an accurate comparison to be made they must be carefully drawn by the same artist on an enlarged scale.

Pedoptila nemopteridia, Butl., Ann. Nat. Hist., 5th ser., vol. xv., p. 341, fig.; Waterhouse, Aid, pl. 26, f. 165, 1, ♂.

Cape Coast, West Africa. Collected by Swanzy.

In the type-specimen the claspers are open, and can

be very well seen; they are strongly hooked. The ends of the fore wings being both damaged it is not possible to see the fork of the subcostal shown in Butler's figure, and his drawing of the recurrent vein in the cell is incorrect, as I have seen in the specimen itself.

Pedoptila Staudingeri, Rogenhofer, Sitz. Zool. Bot. Ges., xxxviii., p. 61 (1888); id., Ann. k. k. Natur. Hof. Mus., 1889, t. xxiii., 9, ♂.

Sierra Leone, West Africa. Four males, one female, in Mus. Staudinger.

Of this Rogenhofer says that it is near *P. nemopteridia*, but differs in the broad middle cell, which is closed by a faint transverse nervure, the veins 5 and 6 springing from a common stalk, as well as by the quite differently formed hind wing, which shows inwardly an angular projection; as also by the rounded somewhat spoon-shaped white point. This description and figure shows that this species does not agree with *Pedoptila* in venation, but has, like *Thymara*, two free internal veins, and tends to confirm my opinion that venation is too variable in this family to be used as a generic character.

Genus Semioptila, *Butl.*, Ann. Nat. Hist., 5th ser., xx., p. 180 (1887).

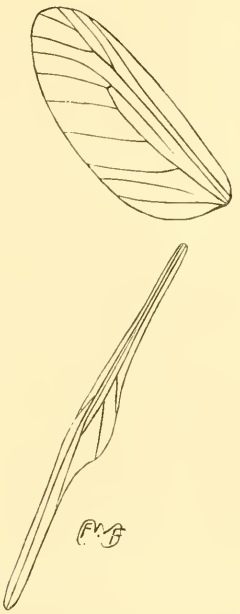
Semioptila torta, Butl., *l. c.*

The type came from the Congo River, and is in the possession of Mr. P. Crowley, of Croydon.

Though the specimen may be sufficient to distinguish some characters, it is in such bad condition and so nearly denuded of scales that it is certainly insufficient from which to describe a species, and I am astonished that Mr. Butler should have attempted to do so. It is, however, judging by the remnants of the antennæ and by the abdomen, a female.

This genus differs from the preceding ones in having four branches to the subcostal vein, and, as far as I can see from an examination of the type, which was kindly lent me by Mr. Crowley, it has two free internal veins in the fore wing, as the last species, and only two veins in the

hind wing, the inner one of which is branched, as shown by Mr. Butler.*



* I annex a woodcut of the venation of this insect, made by Mr. Frohawk from the type-specimen, which may serve to identify the species in future, and which shows what I had not been able to see myself, and what Mr. Butler has not noticed, *viz.*, that the upper half of the cell is apparently open, though there is a faint indication of a transverse vein closing it. The hind wings also appear to be different in venation from what either Mr. Butler or I had supposed.

Explanation of Plate X.

Figs. 1, 2. *H. Doubledayi*, Elwes (males).
3. Female of the same.
4. Neuration of male, enlarged.
5. Neuration of female, enlarged.
6. Antenna of female, highly magnified.
7. Antenna of male.
8. *Thymara zaida*, Doubl., ♂.
9. *T. caudata*, Moore, ♂.
10. Neuration of *T. zaida*, enlarged.
11. Neuration of *T. caudata*, enlarged.
12. Antenna of *T. caudata*.

IX. *On some aquatic Coleoptera from Ceylon.* By David Sharp, M.B., F.L.S., F.Z.S., &c.

[Read March 5th, 1890.]

During a visit of a few months to Ceylon, in 1882, Mr. George Lewis obtained an interesting collection of Coleoptera, and placed the water-beetles in my hands for determination. As the collection was a very fragmentary one and can include but a small proportion of the aquatic Coleoptera that exist in the island, neither Mr. Lewis nor myself anticipated that it would add much to our knowledge of the fauna of the island. I have however found on working through it, that the collection includes a considerable proportion of novelties, and that of the remainder a large part are species that have been either very imperfectly described by Motschoulsky and Walker, or that have not previously been known to occur in the island. I have therefore drawn up a complete list of the *Dytiscidæ* and *Hydrophilidæ* obtained by Mr. Lewis, omitting only two or three specimens that are representative of species requiring further materials for their elucidation. I may mention that Mr. Lewis also brought back a series of nine species of *Gyrinidæ*, but as all are described in Dr. Régimbart's recent monograph of the family, I have not thought it worth while to include a list of them.

In dealing with the species that were so imperfectly described by Walker in the Ann. & Mag. Nat. Hist., 1858 and 1859, I have followed the course advocated by Mr. H. W. Bates, Ann. & Mag. Nat. Hist., January, 1886, that is to say, when the species have not in the interim been described under other names I have given a description, making use of Walker's proposed name. But when the species has already been described under another name, I have adopted this latter, as Walker's descriptions are so brief, imperfect, and erroneous that they can have no claim to priority.

Mr. Lewis has given some particulars about the localities where he collected these insects in the 'Transactions' of the Society, 1882, pp. 475, *et seq.* His remarks contain, however, no special references to the water-beetles.

DYTISCIDÆ.

Hydrocoptus subvittulus.

Hydrocoptus subvittulus, Motsch., Etudes Ent., viii., 1859, p. 43.

Oblongo-ovalis, transversim convexus, testaceus, elytris castaneis, lateribus vittaque obsoleta singuli in medio testaceis, seriebus regularibus numerose punctatis. Long. 2 mm.

Allied by the punctuation of the elytra to *H. distinctus*, Wehncke (*rubescens*, Shp., Dyt., No. 9), but differing by the colour of the elytra, and by the presence of some punctures along the base of the thorax.

I think this is probably the *H. subvittulus* of Motschoulsky, a species which is apparently not included in the Munich Catalogue, and is not referred to in my systematic work on the family.

About fifteen specimens were procured in February, 1882, at Dikoya and Kandy, exhibiting very little variation.

Hydrocoptus bivittis.

Hydrocoptus bivittis, Motsch., *op. cit.*, p. 44.

Two specimens at Kandy in February.

Canthydrus luctuosus.

Hydrocanthus luctuosus, Aubé, Spec. Gen. Hydroc., p. 408.

Dikoya; a good series. Most of the specimens are *C. sexpunctatus*, Shp., which must be reduced to a synonym, as it is no doubt either a variety, or the other sex, of *C. luctuosus*. A single specimen found at Bogawantalawa is to some extent intermediate between *C. luctuosus* and *C. lætabilis*, but may probably prove to be a distinct species.

Canthydrus lætabilis.

Hydroporus lætabilis, Walk., Ann. & Mag. Nat. Hist. (3), ii., p. 205 ; Sharp, Dyt., No. 62, p. 277.

Colombo, in April. About twenty specimens, varying greatly. Only three or four belong to the typical form in which there are two spots at the base of each wing-case ; the others have the two basal yellow spots confluent so as to form a band, and in most of them the black colour is replaced by a fuscous colour.

Laccophilus parvulus.

Laccophilus parvulus, Aubé, Spec. Gen. Hydroc., p. 429.

Colombo. One specimen.

Laccophilus inefficiens.

Hydroporus inefficiens, Walk., Ann. & Mag. Nat. Hist., 1859, p. 51.

Ovalis, parum convexus, nitidus, testaceus ; prothorace marginibus anterioribus (hoc obsolete) et posterioribus in medio fusco-maculatis ; elytris fusco-vermiculosis, pone basin fascia flammulata arguta pallide testacea. Long. 3½, lat. vix 2 mm.

On the front of the thorax there are two obsolete fuscescent marks, nearly or quite confluent, and at the base of the thorax two larger marks. The dark marks on the elytra are coarse and cover the larger part of the surface ; they do not appear as undulatory or zigzag parallel lines, but leave isolated irregular pallid irrorations between them ; the fascia behind the base is very definite though irregular, and the dark colour in front of it is interrupted by about six radiating pallid dashes ; behind the middle there is a trace of a pallid fascia, the outer dark marks being absent there and the pallid marks between this and the suture larger.

This species has not been intelligibly described previously. So far as is known, it is peculiar to Ceylon, where it appears to be no rarity. It may be placed next *L. clarki*.

Laccophilus anticatus, sp. nov.

Ovalis, subdepressus, nitidus, rufo-testaceus, subtus infuscatus ; elytris nigris, fascia arguta subbasali, signaturis post medium et ad apicem, margineque externo testaceis. Long. 3⅛, lat. 1¾ mm.

Head and thorax yellow, the latter with only trace of fuscescence at the base. Elytra blackish, with a very definite pallid fascia near the base, the front margin of this fascia only slightly, the posterior more strongly, irregular; just behind the middle there is a large pale mark, not so definitely limited as the anterior fascia and not extending to the suture, and at the extremity there is another similar but smaller and still less definite pale mark. Under surface more or less infuscate.

This species has no trace of zigzag longitudinal marks on the elytra, and comes near to *L. siamensis*, Shp., from which it differs, however, in being considerably smaller, and in having the pallid marks smaller, the basal fascia especially being smaller and more definite.

Colombo, in April. Fifteen examples.

Laccophilus flexuosus.

Laccophilus flexuosus, Aubé, Spec. Gen. Hydroc., p. 430; Régimbart, Ann. Soc. Ent. Fr. (6), ix., p. 151.

Colombo. One specimen.

According to Dr. Régimbart the insect considered by me (Tr. Dubl. Soc. (2), ii., p. 310) to be *L. flexuosus*, Aubé, is really distinct therefrom, and he has proposed the name of *L. sharpi* for it. The specimen found by Mr. Lewis as above certainly agrees better with Aubé's description than those I previously identified therewith.

Laccophilus rufulus.

Laccophilus rufulus, Régimbart, Ann. Mus. Genov. (2), vi., p. 611.

Colombo. One specimen.

Neptosternus taprobanicus, sp. nov.

Ovalis, subdepressus, rufo-testaceus, nitidus; elytris nigricantibus, flavo-maculatis. Long. 3, lat. $1\frac{3}{4}$ mm.

This is closely allied to the Madagascar species, *N. ornatus*, but is a rather smaller insect, and has much difference in the spots of the elytra; these are as follows, on each wing-case: two near the base, the outer of them at the shoulder and not elongate; a transverse one just behind the middle, extending from the outer margin more than half-way to the suture; and a large apical mark not extending

to the suture. The hind angles of the thorax are prolonged backwards in a spiniform manner.

Mr. Lewis obtained about a dozen examples of this species in a rapid stream at Kitulgalle.

Hydrovatus castaneus.

Hydrovatus castaneus, Motsch., Et. Ent., 1855, p. 82.

Colombo.

Hydrovatus fusculus.

Hydrovatus fusculus, Sharp, Dyt., No. 193, p. 326.

Kandy and Colombo.

Hydrovatus elevatus.

Hydrovatus elevatus, Sharp, Dyt., No. 199, p. 328.

Kitulgalle. Only one specimen was obtained; it is a variety of very small size.

Hydrovatus sinister, sp. nov.

Subrotundatus, testaceus; elytris fusco-testaceis, fortiter punctatis, ad apicem profunde sinuatis. Long. $2\frac{1}{2}$ mm.

Head broad and short, very indistinctly impressed on each side, obscurely margined in front, very densely and finely reticulate. Thorax rather sparingly and finely punctured, densely and finely reticulate. Elytra rather coarsely and regularly punctate, shining, very indistinctly reticulate; the acumen at the extremity remarkably definite. Under surface shining, coxæ coarsely punctate. Prosternal process triangular, not sinuate at the sides. There is only a very slight difference in the structure of the antennæ of the two sexes, but in the male they are distinctly a little longer, and very slightly broader than they are in the female, and joints 4—7 of the antennæ are just perceptibly broader.

This species should be placed near *H. fractus*, Shp.; it is more sparingly punctate and more shining, and has the acumen at the extremity of the elytra remarkably definite and distinct.

Colombo, in April. About a dozen specimens.

Hydrovatus subtilis, var.

Hydrovatus subtilis, Sharp, Dyt., No. 203, p. 329.

Six specimens procured by Mr. Lewis at Colombo in April agree with the types from Siam, except that the antennæ of the male have the intermediate joints more dilated.

Bidessus bufo, sp. nov.

Oblongo-ovalis, latiusculus, testaceus, parum nitidus, crebre punctatus; elytris fusco-submaculatis. Long. 2 mm.

Antennæ short. Head short and broad, with fine distinct elevated margin in front. Thorax very strongly transverse, indistinctly punctate, at the base with a curved plicate impression, which on the elytra is continued as a straight line appearing externally as an elevation; the punctuation of the elytra is dense and distinct, there is no pubescence, they are of a pallid sordid testaceous colour, with numerous very indistinct small black spots; the plica at the base of each extends about one-sixth of the length. The under surface is coarsely punctate.

This is a very distinct species from any other known, and should be placed at the end of Group 1 of the genus. The thorax is peculiar, being impressed along each side parallel with the margin.

Kandy, in February. Five specimens.

Bidessus intermixtus.

Hydroporus intermixtus, Walker, Ann. & Mag. Nat. Hist. (3), ii., p. 204; Sharp, Dyt., No. 289, p. 358.

This appears to be rather variable in colour; some of the individuals possess fuscous marks on the elytra, while in other specimens these can scarcely be detected.

Dikoya, in February; on the Hadley Estate. Six specimens.

Bidessus gentilis, sp. nov.

Ovalis, angustulus, parum nitidus, testaceus; elytris abdomineque fuscescentibus, illis vage testaceo-signatis; stria basali elytrorum nulla, stria suturali obsoleta, tantum ad apicem bene impressa. Long. 2 mm.

This species should be placed after *B. flammulatus*, Shp., with which it agrees in not having a continuation of the thoracic stria

on the elytra, but from which it differs in having the sutural stria obsolete. The antennæ are short, yellow. Thorax sparingly and obsoletely punctured, yellow fuscescent at the base, on each side with a fine but elongate stria. Elytra rather closely and finely punctured and pubescent, dull; fuscescent, with yellow marks externally, sutural stria distinct at the extremity only. Under surface only very sparingly and obsoletely punctured.

Kitulgalle. Nine specimens. The yellow marks on the elytra are variable.

Hyphydrus indicus.

Hyphydrus indicus, Sharp, Dyt., No. 353, p. 382.

Dikoya, in January and February. Twenty specimens.

This species was previously known only by a single individual of the male sex. Mr. Lewis obtained the female as well as the male. The individuals of the former sex are a good deal smaller, more dull and more finely punctured, the front and middle tarsi are quite small; there is no impression on the elytra. The maculation of the tarsi exists in each sex. There is apparently very little variation.

Hyphoporus pugnator, sp. nov.

Ovalis, convexus, fortiter punctatus parum nitidus, pectore abdomineque nigris, supra testaceus, vertice summo, prothorace basi in medio elytrorumque signaturis nigris; antennis pedibusque rufis; tarsis anterioribus et intermediis nigris. Long. 5 mm.

Head with broad but only very slightly elevated margin in front, the vertex behind the eyes blackish. Thorax very densely punctured. Elytra with remarkably coarse and deep, rather close punctuation, and with a few fine punctures on the interstices.

Dikoya, January 26th, 1882.

Walker's type of *H. interpulsus* is an insect similar to *H. pugnator*, but with much more scanty punctuation on the elytra. Mr. Lewis obtained one specimen at Hadley that is probably referable to Walker's species.

Copelatus pusillus.

Copelatus pusillus, Sharp, Dyt., No. 854, p. 580.

Colombo. One specimen.

Rhantus taprobanicus, sp. nov.

Anguste ovalis, nitidus, niger, supra testaceus; elytris crebrius nigro-irroratis vertice inter oculos prothoraceque disco nigro-signatis; elytris punctis seriatis conspicuis; antennis pedibusque quatuor anterioribus testaceis. Long. 12 mm.

Very similar to the widely distributed *R. pulverosus*, but of narrower and more parallel form, and with the serial punctures on the elytra very different, they being comparatively large and distant, and much more conspicuous than the very numerous minute punctures of which the series are composed in the well-known *R. pulverosus*. The structure of the front feet of the male is almost similar to that found in *R. pulverosus*, and there is scarcely any difference in the sculpture of the sexes.

Hadley and Bogawantalawa. Six specimens.

Rhantus interclusus.

Colymbetes interclusus, Walker, Ann. & Mag. Nat. Hist. (3), ii., p. 204.

Ovatus, parum convexus, nitidus, nigricans; supra testaceus, capitis signaturis, prothorace late in medio elytrorumque irrorationibus nigris; pedibus piceo-testaceis, posterioribus piceis. Long. 12 mm.

Distinguished from *R. taprobanicus* by the whole of the middle of the pronotum, from front to hind margin, being black; the serial punctures on the elytra are not so large, and the female has a much more distinct reticulation—the meshes being larger as well as more distinct—on the thorax and elytra.

Hadley. One female example. This and Walker's type in the British Museum are the only specimens of the species I have seen.

Hydaticus rhantoides.

Hydaticus rhantoides, Sharp, Dyt., No. 1036, p. 664.

Colombo; three specimens of unusually small size and narrow form.

Hydaticus bihamatus.

Hydaticus bihamatus, Aubé, Spec. Gen. Hydroc., p. 174.
H. discindens and *H. fractifer*, Walk., Ann. & Mag. Nat. Hist. (3), ii., p. 204.

About twenty specimens, obtained most of them at Bogawantalawa in March, represent three well-marked varieties or races previously unknown to me. The difficulties connected with the specific discrimination of *H. bihamatus* and its allies have already been noticed by myself, and more recently by Dr. Régimbart (Ann. Soc. Ent. Fr., 1889, p. 154). If all the forms mentioned by this *savant* be really one species the variation is extreme; but I think myself it is more probable that there will prove to be several good species, each variable in colour. At present sufficient materials for deciding this question do not exist in our collections. *H. fractifer*, Walker, is a variety not obtained by Mr. Lewis; *H. discindens*, Walker, is one of the varieties mentioned above.

Hydaticus vittatus.

Dytiscus vittatus, Fab., Syst. Ent., App., p. 825.

Hadley. The specimens are of small size and narrow form, with a greater development than usual of the yellow colour on the thorax and elytra. Two specimens from Lynford are a remarkable new variety, in which the yellow colour occupies about one-half of the area of the wing-cases.

Sandracottus festivus.

Dytiscus festivus, Ill. Mag., i., p. 166.

Bogawantalawa, in March. Two specimens.

Cybister ventralis.

Cybister ventralis, Sharp, Dyt., No. 1161, p. 742.

This species is only known by one example of the male sex from Madras. I refer to it with considerable doubt three specimens from Ceylon in the collection of Mr. Lewis, the form being more elongate than in the typical example. These specimens were obtained from different sources, and there is a great sexual disparity between them; but as there is not, under the circumstances, sufficient evidence that they belong to the same species, I shall not remark farther on them.

Cybister sugillatus.

Cybister sugillatus, Er., Nov. Act. Ac. Cæs. Leop., xvi., p. 227.

Dikoya and Bogawantalawa. Seven specimens—all similar—of a small narrow variety of this widely distributed species.

Cybister wehnckianus.

Cybister wehnckianus, Sharp, Dyt., No. 1152, p. 737.
Dytiscus extenuans, Walker, Ann. Nat. Hist. (3), ii., p. 204.

This species has been previously known only by one female example, the locality of which was given as "East India?". Mr. Lewis has now procured three examples representing both sexes, and I think it probable the species may prove peculiar to Ceylon. The male has very small anterior tarsi; sexual sculpture in the female is absent, but the peculiar impressions on the metasternal laciniæ are quite as strongly marked as in the other sex. One of the three specimens is from Kandy; the other two are not labelled.

HYDROPHILIDÆ.

Sternolophus rufipes.

Hydrophilus rufipes, Fab., Syst. El., i., p. 251.

Peradenyia, 20th February, 1882. Four specimens.

Hydrobius minimus, sp. nov.

Ovalis, convexus, nitidus, fuscus; antennis basi palpisque flavis capite thoraceque nigricantibus illo utrinque flavo-maculato, hoc ad latera late testaceo; elytris parce punctatis, ad apicem colore dilutiore. Long. vix 2 mm.

Palpi short and stout, terminal joint longer than the penultimate, fuscescent at the apex. Head almost impunctate, blackish, with a yellow mark over the insertion of each antenna. Thorax very short, polished, impunctate. Elytra with a deep sutural stria reaching nearly to the scutellum, finely and sparingly punctate. Legs slender, rufescent; tarsi very slender.

This obscure little insect will not enter into any of the divisions that have recently been made for the

smaller species of the old genus *Hydrobius*, but the characters of these divisions are of somewhat doubtful importance, being variable from species to species. *H. minimus* has a small curvate transverse elevation on the mesosternum, and the front and middle femora pubescent beneath, while the hind femora are pubescent merely along their anterior margin.

Dikoya, in January. A small series of examples.

Hydrobius evanescens, sp. nov.

Ovalis, angustus, fuscus, supra æneus; elytris apice flavescente, antennarum basi palpis pedibusque testaceis; supra crebre punctatus. Long. 2 mm.

This is very similar to *H. minimus*, but is somewhat brassy in colour above, and is more distinctly punctulate. On the under surface the hind femora have no pubescence, and the mesosternal crest is more marked, the transverse elevation being rather more raised, while from the middle of it there extends backwards a slight longitudinal carina.

Kitulgalle and Kandy. Two specimens.

Hydrobius (*Anacæna*) *advena*, sp. nov.

Ovalis, convexus, nitidus, testaceus, supra piceus, limbo dilutiore; elytris parce punctatis. Long. $2\frac{1}{8}$ mm.

Palpi pale yellow, quite short, terminal joint twice as long as the preceding one. Head shining, impunctate. Thorax also impunctate. Elytra with elongate sutural stria, sparingly but not finely punctured.

This species has the mesosternum unarmed, and the hind femora covered with pubescence beneath, except at the tip, so that it may be placed in *Anacæna*. Looking at the upper surface only it may be distinguished from *H. minimus* by being rather larger, and having the elytra considerably more coarsely punctate.

Bogawantalawa, in April. Three specimens.

Philydrus iteratus, sp. nov.

Ovalis, niger, nitidus; prothorace lateribus piceis, antennarum basi, tarsis, palpisque rufis, his articulo basali nigricante, antennarum clava fusca; dense minus fortiter punctatus. Long. 7 mm.

Palpi elongate, penultimate joint much longer than the terminal one, which is about half as long as the true second joint. Antennæ with the terminal joint rather long, twice as long as the penultimate one. Thorax densely punctate, the sides narrowly piceous, the hind angles rounded. Elytra densely punctate, the three series of larger punctures distinct but very irregular, each series having additional punctures near it. Mesosternal lamina very large, forming an acute angle in front, although the front margin is somewhat rounded; this angle projects considerably below the breast. Claws very small.

Colombo, in April. Five specimens.

This species is similar to many others in size and form, but does not appear to be very closely allied to any other I know.

Philydrus fragilis, sp. nov.

Anguste ovalis, convexus, politus, obsolete punctatus, testaceus, vertice nigricante; subtus fuscus. Long. 4 mm.

Palpi clear yellow, clypeus yellow, slightly more obscure in the middle, vertex blackish. Elytra with deep sutural stria, which, however, does not extend to the base, the sutural interval behind darker in colour; the punctuation very obsolete and the serial punctures fine; the punctuation of the thorax is scarcely so obsolete as that of the elytra, and on the head it is still less obsolete. The tarsi are very slender, the claws quite small. The mesosternum bears a very large lamina, the lower margin of which is continuous with the plane of the breast, while the front angle is distinctly more prominent downwards.

Dikoya, in January. Three specimens.

Philydrus escuriens.

Philydrus escuriens, Walk., Ann. & Mag. Nat. Hist. (3), ii., p. 209.

Pylophilus nigriceps, Motsch., Etudes Ent., 1859, p. 46.

Testaceus, capite nigro, utrinque flavo-maculato; obsolete punctatus, tenuissime pubescens, subnitidus. Long. $2\frac{1}{2}$ mm.

P. escuriens is one of the smallest insects of the genus; the apex of the maxillary palpus is infuscate, the mesosternal lamina is very peculiar; it appears extremely short on its lower face, but in fact extends as an elongate carina traversing the whole length of the obliquely ascending mesosternum.

I have examined Walker's type, and possess also a type of Motschoulsky's; so that the nomenclature is certain, although Motschoulsky states that his insect has no mesosternal carina.

Philydrus abnormalis, sp. nov.

Niger, supra piceus, limbo dilutiore; antennis palpisque testaceis, pedibus sordide rufis; obsolete punctatus; palpis elongatis ut in genere Helocharidi constructis. Long. 3—4 mm.

Palpi very long, the pseudobasal joint slightly curved, as in *Helochares*, and the terminal joint also articulated as in *Helochares*, to bend inwards, not outwards, as is the case in the normal *Philydri*. Antennæ yellow, the club slightly more obscure, not setose, the intermediate joints are consolidated, though the position of the sutures may still be detected. Head narrow, black, rather closely and finely punctate. Thorax closely and subobsoletely punctate. Elytra still more obsoletely punctured, with very distinct sutural striæ, not quite attaining the base. Legs quite slender, pitchy-red; tarsi yellowish. Mesosternum with a lamina which is scarcely more than a strongly raised longitudinal keel.

The structure of the palpi will no doubt justify this insect being separated from *Philydrus*, but I do not think it necessary to propose a new genus for it at present.

Colombo, 17th April, 1882. Three specimens.

Helochares taprobanicus, sp. nov.

Nigerrimus, nitidus, dense punctatus, antennarum basi tarsis palpisque rufis, his elongatis, articulo basali fuscescente. Long. 7 mm.

Palpi quite $2\frac{1}{2}$ mm. long, the second true joint infuscate before the extremity, the third joint also a little darker in the middle, terminal joint much shorter than the third joint. Antennæ with the club fuscescent, the terminal joint quite twice as long as the preceding one. The upper surface is moderately closely, rather finely punctate, very shining, the two series of punctures on the elytra rather fine and not very distinct. Mentum deeply curvately rugose, in front with a deep emargination. Mesosternum with a small elevation on the middle. Claws moderately large.

Colombo, in April. Five specimens.

There is a group of species of *Helochares* occurring in the tropics of Old and New Worlds with very long palpi,

the middle breast feebly armed, and with the mentum excised in front; they should, no doubt, form a distinct genus. *H. taprobanicus* is the smallest insect of this group in my collection.

Helochares anchoralis, sp. nov.

Anguste ovalis, subdepressus, subtus, fuscus, supra testaceus, dense punctatus; elytris subtiliter striatis; pedibus elongatis, sat robustis, tarsis cum unguiculis magnis. Long. 6 mm.

Maxillary palpi rather elongate and stout, pale yellow. Antennæ yellow, the club more dusky; nine-jointed, 2nd joint elongate, equal to the following three together, 6th joint elongate in front, and receiving and covering the base of the club, this is elongate, very pubescent, terminal joint longer than usual. Head densely punctured. Thorax rather strongly transverse, but little rounded at the sides, densely punctate. Elytra very densely and evenly punctured, finely striate, the striæ very nearly obliterated at the base, deeper at the deflexed extremity. Mesosternum unarmed. Claws at the extreme base beneath with a slight swelling, and also with a short onychium, which bears two elongate setæ. Sides of the head beneath with long setæ behind the eyes.

Colombo, in April. Four specimens.

Helochares lentus, sp. nov.

Ovalis, sat convexus, testaceus, subtus fuscus; dense punctatus, et in elytris seriatim fortiter punctatus. Long. 4¼ mm.

Palpi clear yellow, moderately long. Head narrow; labrum large. Thorax closely and rather coarsely punctured, a little narrowed in front, hind angles rounded. Elytra with moderately distant rather fine punctuation, and also with very distinct series of much larger punctures; both serial and diffuse punctuation are diminished behind. Mesosternum with a feeble swelling at its apex. Legs rather feeble, claws small.

Dikoya, in January. Four specimens.

Helochares densus, sp. nov.

Ovalis, subdepressus, testaceus, subtus fuscus, dense punctatus, et in elytris seriatim minus fortiter punctatus. Long. 4¼ mm.

This is closely allied to *H. lentus*, but may be easily enough distinguished by the serial punctuation on the elytra being less coarse and less deep, while the diffuse punctuation is rather more

coarse and close, so that the surface is less shining. *H. densus* is also a less convex insect, and the serial punctuation is quite obsolete at the extremity of the elytra.

Kandy and Dikoya, in February; Bogawantalawa, in March. Half-a-dozen examples.

Laccobius rectus, sp. nov.

Ovalis, subdepressus, fuscus, nitidus, fere lævigatus, capite thoraceque nigricantibus, illo anterius utrinque, hoc ad latera flavis; antennis, palpis, pedibus elytrisque pallide flavis, his lineis multis nigris ornatis. Long. 2¼ mm.

Head yellow beneath, dark above, marked rather indistinctly with yellow on each side, obsoletely punctate. Thorax dark in colour, with the sides broadly yellow, almost impunctate. Elytra yellow, with elongate uninterrupted lines of dark colour; these lines are very numerous, and each one is about as wide as the interval separating it from the next; there is some extremely minute punctuation serially arranged. The mesosternum is armed with a conspicuous lamina.

Kitulgalle. Six specimens.

I do not know any other *Laccobius* in which the alternate yellow and black lines are arranged as definitely as in this species.

Berosus decrescens.

Berosus decrescens, Walker, Ann. & Mag. Nat. Hist., 1859, p. 258.

Parvus, testaceus; abdomine fusco, capite metallescente; thorace in medio metallico-bivittato; elytris fusco-irroratis; crebre minus subtiliter punctatus, elytris pube depressa vestitis, subtilissime striatis. Long. 3 mm.

In this insect the mesosternum has a fine carina extending over all its length, but scarcely raised from the surface, so that it might be overlooked, except that it is black in colour, while the breast is yellow. The club of the antennæ is clear yellow. The punctuation of the upper surface is rather coarse, and the striæ of the elytra are so fine that they are only conspicuous because of their course being indicated by a line of black colour. Each puncture on the wing-cases is also marked with black, and there are a few distant small black spots.

Kitulgalle. A series of specimens.

Volvulus æneus.

Volvulus æneus, Br., Hist. Nat., v., p. 282.

Dikoya, in January. One specimen.

This species is said by Erichson to be the *Hydrophilus attenuatus*, Fab., but I am not at all sure this synonymy is correct, as Erichson was not aware that there are numerous closely allied species of *Volvulus*.

Globaria leachi.

Globaria leachi, Latr., Règn. An., iv., p. 521.

Kandy, 20th February, 1882. Four specimens.

The Ceylon examples of this insect have the serial punctures on the sides of the elytra less distinct than examples from other localities in Asia, and may possibly be another species.

Amphiops simplex, sp. nov.

Rotundatus, nitidus, piceo-testaceus, dense punctatis; elytris punctatura suturam versus obsoletescente, ad latera absque punctis seriatis. Long. 3¼ mm.

Palpi and base of antennæ clear yellow. Head without concentration of punctures on the front; canthus dividing the eyes very slight. Thorax shining. Elytra with dense punctuation, which is coarse at the sides, obsolete at the suture.

This is more dilute in colour than the other species of the genus, and is the only one yet known in which there is no trace of larger serial punctures at the sides of the elytra. *A. pisiformis*, Fairm., comes nearest to it.

A. simplex was procured in some numbers by Mr. Lewis at Colombo in April.

Amphiops pedestris, sp. nov.

Subrotundatus, nitidus, piceus, palpis antennis tarsisque testaceis; elytris fortiter seriatim punctatis. Long. 3 mm.

Head with very numerous punctures, the punctuation uneven, consisting of small punctures with which some larger punctures are mixed. Thorax with the punctuation quite obsolete on the disc, but moderately distinct at the sides. Elytra shining, with series of coarse punctures, and on the interstices with a few rather large distant punctures, the series near the suture very indistinct.

Colombo, in April. This is apparently not an uncommon insect, as Mr. Lewis brought back about twenty examples.

Amphiops mirabilis, sp. nov.

Subrotundatus, niger, nitidus, subtus piceus, tibiis dilutioribus; antennis, palpis tarsisque testaceis; elytris fortiter seriatim punctatis, interstitiis crebre fortiterque punctatis. Long. 3½ mm.

This is closely allied to *A. pedestris*, but is no doubt distinct, the large punctures of the upper surface being larger and more numerous. Head not very shining, the numerous large punctures being mixed with others much smaller, and which render the surface rather dull; at the sides of the thorax there are also rather numerous large punctures, and others much smaller. At the sides of the elytra the interstitial punctuation is so numerous and coarse that, being similar to the serial punctuation, this last can scarcely be discriminated from it; the series of punctures near the suture are subobsolete, and the interstitial punctuation there is almost wanting.

Kandy, 20th February, 1882. One specimen.

Hydrochus lacustris.

Hydrochus lacustris, Nietner, Ann. Nat. Hist. (2), xix., p. 386.

Colombo. Two specimens.

Epimetopus flavidulus, sp. nov.

Sordide testaceus, pectore capiteque nigris; prothorace fusco; hoc inæquali; elytris tuberculis elongatis metallescentibus munitis. Long. 3 mm.

Palpi short, with elongate aciculate terminal joint; sordid yellow. Thorax greatly produced in the middle in front, at the sides much narrowed behind, so that the base is only about half the width of the wing-cases, the surface, rather rough and uneven, with a peculiar marginate elevation on the middle near the front of the produced part. Elytra yellow, with three or four rows of metallescent elongate tubercular elevations, which do not extend on to the declivous apical portion, or rather are there much smaller and more distant; between the tubercles there is some indistinct seriate sculpture. Metasternum short. Ventral segments yellow, polished.

One example of this interesting little insect was found

at Kandy, 18th February, 1882. It is abundantly distinct from *E. bullatus*, Shp.

PROTOSTERNUM, gen. nov.

Corpus oblongo-ovale, subdepressum. Prosternum, mesosternum et abdominis segmentum basale carinata. Tarsi perbreves, posteriores articulis tribus basalibus longitudine subæqualibus.

This genus is established for a single species—a very minute insect—having the form of the species of *Dactylosternum*, but differing therefrom by the mesosternum possessing merely a slightly elevated carina along the middle. By this character, and by its general facies, it approaches the Central American genus *Heteryon*, but in that genus the first ventral segment is not carinate. The palpi are quite short, the antennæ have a very elongate club; the mentum is deeply and broadly impressed on the middle in front; the carina on the prosternum is very minute; the mesosternal carina is fine and is divided into two parts, the anterior of which emits a small branch on either side; the metasternum is also feebly carinate in its anterior part. The carina on the first ventral segment is fine but very definite and elongate. The whole of the under surface is covered by a minute sculpture making it quite dull.

Protosternum atomarium, sp.nov.

Rufo-piceum, subdepressum, oblongo-ovale; antennis palpisque flavis; subtiliter punctatum, elytris striato-punctatis, striis postice magis profundis. Long. 1¾ mm.

Antennæ with the club clear, pale yellow. Head broad and short, not visibly margined, very finely punctate, eyes not visible from above. Thorax very short, very little emarginate in front, rather closely and finely punctate, with a large foveiform puncture on each side at the base. Elytra continuous in outline with the thorax, the outer margins very slightly reflexed; with very regular series of coarse punctures, which are finer and appear more like striæ near the suture, and with a very feeble interstitial punctuation.

Dikoya and Kandy. Four specimens.

Cyclonotum simplex.

Cyclonotum simplex, Sharp, Trans. Ent. Soc. Lond., 1874, p. 419.

Hydrobius stultus, Walker, Ann. Nat. Hist. (3), ii., p. 209.

Colombo. Several specimens.

Sphæridium quinquemaculatum.

Sphæridium quinquemaculatum, Fab., Ent. Syst., Suppl., p. 39.

S. tricolor, Walker, Ann. Nat. Hist. (3), ii., p. 209.

S. quinquemaculatum is a very abundant insect in Hindostan and China, and, like some others of the genus, varies greatly in the coloured markings of the upper surface. Walker's type of *S. tricolor* is, however, only a very slight departure from the definitely five-spotted form described by Fabricius.

Cercyon lineolatus.

Trichopoda lineolata, Motsch., Bull. Mosc., 1863, i., p. 444.

Galle, in December, 1881. Half-a-dozen specimens.

Cercyon vicinalis.

Cercyon vicinale, Walker, Ann. & Mag. Nat. Hist., 1859, p. 258.

C. nigriceps, Motsch., Bull. Mosc., 1863, i., p. 445.

C. atriceps, Har. & Gemm., Cat. Col., ii., p. 496.

Motschoulsky's description agrees with specimens that I have compared with Walker's type of *C. vicinale* in the British Museum. The name *C. atriceps*, proposed by Gemminger and Harold as a substitute for Motschoulsky's trivial appellation, becomes therefore superfluous, as it will be the simplest course to adopt Walker's specific appellation for the species.

Galle and Hadley.

Cercyon uniformis, sp. nov.

Rotundato-ovalis, sat convexus, ferrugineus, nitidus, antennarum clava fusca; sat crebre punctatus, elytris striatis, striis postice vix magis profundis. Long. 2½ mm.

Palpi clear yellow. Head truncate in front, rather closely punctate, shining. Thorax very short. Elytra with well-marked, though fine, striæ, extending from the base to the extremity, and rather deeper on the declivous part; the outer striæ are more like rows of punctures, but those near the suture are almost impunctate. The punctuation of the interstices is like that of the

head and thorax, but not quite so close. The mesosternal lamina is largely developed but very slender, and the polished space on the metasternum is sparingly and obsoletely punctate.

This species has in appearance a good deal of resemblance to the genus *Pelosoma*, but the very slender mesosternal lamina quite removes it from the genus in question, and it may be placed near the Japanese *C. olibrus*.

Dikoya, Bogawantalawa, Kandy.

Megasternum nigrovittatum.

Pachysternum nigrovittatum, Motsch., Bull. Mosc., 1863, i., p. 447.

The genus *Pachysternum*, founded by Motschoulsky for this insect, *op. cit.*, p. 446, must fall as a synonym of *Megasternum;* Motschoulsky compared his genus only with *Cryptopleurum*, from which it is, of course, abundantly distinct, and says nothing about its relations to *Megasternum*, from which I see nothing to distinguish it.

Mr. Lewis found one specimen of *M. nigrovittatum* at Kitulgalle.

ARMOSTUS, gen. nov.

Corpus rotundato-ovale, convexum. Prothorax utrinque ad marginem anteriorem profunde excavatus. Mesosternum processu maxime elevato, facie inferiore polito fortiterque punctato, ovali, instructum. Metasternum in medio elevatum, politum fortiterque punctatum. Tarsi breves, posteriores articulo basali sequentibus tribus conjunctis æquali.

Mentum with deep punctures, emarginate in front; projecting from its front margin there is a very dense ciliation; maxillary palpi slender and rather elongate, terminal joint aciculate. Prosternum with a sharp carina along the middle of the transverse process in front of the coxæ, and on either side of this process with a large deep excavation for the reception of the club of the antennæ. Basal ventral segment carinate along the middle. Hind tarsi rather short, the basal joint thicker than the others.

This genus is established for a single species allied to *Oosternum*, but differing by the large unimpressed mentum, by the large antennal cavities, and the very remarkable development of the mesosternal and metasternal elevations, as well as by the compressed and

rigid tarsi, much thicker at the base than at the apex. The position should be between *Oosternum* and *Peratogonus*, to which latter peculiar genus it makes a considerable approach.

Armostus optatus, sp. nov.

Rotundato-ovalis, convexus, rufus, supra piceus, palpis antennarumque basi flavis; fortiter punctatus, elytris profunde striato-punctatis, interstitiis convexis. Long. $1\frac{3}{4}$ mm.

Head finely margined in front, closely and rather coarsely punctured. Thorax rather coarsely and closely punctured at the sides, more sparingly on the disc. Elytra with very deep striæ, which bear rather large punctures, the interstices are broad in front, and become narrower and more elevated behind; there is no pubescence; the apex is flavescent. The under surface is finely unctate and dull, except the remarkable mesosternal and metasternal elevations.

Dikoya, in December, 1881. Two specimens.

X. *Notes on Lepidoptera from the region of the Straits of Gibraltar.* By James J. Walker, R.N., F.L.S.

[Read March 5th, 1890.]

The following remarks on the Lepidoptera observed by me on both sides of the Straits of Gibraltar must not be regarded as at all exhaustive of the subject, but rather as indicating merely a fragment of the entomological riches of a region which, though of limited extent, comprises portions of the continents of Europe and Africa, and moreover presents some interesting features in the relative distribution of the insects and other living things on each side of the narrow channel which separates these two great masses of land. It is in the hope of adding a little to the knowledge of the Natural History of one of our most interesting and valued British possessions, and of the country in its immediate vicinity, as well as of their affording some little assistance to any entomologist who, like myself, may have the good fortune to be located for a time at Gibraltar, that I offer these field-notes, with a brief description of my principal hunting-grounds in the region.

From October, 1886, to April, 1889, I was attached to H.M.S. 'Grappler,' stationed at Gibraltar, and naturally my chief collecting-ground was on "the Rock" itself, and the adjoining Spanish territory within easy walking distance. I was mainly occupied in making as complete a collection as possible of the Coleoptera of the district, and as several other orders of insects, as well as the land-mollusca, claimed a share of my attention, the Lepidoptera cannot be considered as at all thoroughly worked out. The necessary military restrictions of so important a fortress prevent any collecting at night, except almost in the town itself, and as all communication with Spain is cut off half-an-hour after sunset every evening by the closing of the barrier-gates, no entomological work is practicable outside after that time.

These circumstances render the present list of the nocturnal groups of Lepidoptera a mere fraction of what may reasonably be supposed to exist in so varied a district, though, among the butterflies and the day-flying moths, I think but few have been overlooked.

The great Rock itself, a huge wedge-shaped mass of ancient grey limestone rising abruptly on all sides to a height of little short of 1400 ft., is, on its northern and eastern aspects, quite precipitous and inaccessible; and the steep and arid western and southern slopes, exposed to the full force of the afternoon sunshine, and but scantily covered, except in a few favoured spots, with brushwood and herbage, do not hold out any great promise to the entomologist, or to the naturalist generally. Nevertheless the flora, especially in the spring months, is of singular beauty and interest. The exhaustive 'Flora Calpensis' of Dr. Kelaart (London, 1846) enumerates no fewer than 452 species of flowering plants (one or two of these, so far as Europe is concerned, being peculiar to this little spot) as native to the British territory, and to the narrow sandy isthmus which joins the Rock to the mainland, up to the boundary of the Spanish lines. Insects, too, are to be found in considerable variety, and of the 63 species of butterflies enumerated in these notes, 35 have been observed more or less abundantly on the Rock itself. Of these, *Melitæa aurinia*, var. *Desfontainei*, Godt., and *Anosia plexippus*, L. (the latter represented by a solitary individual, which had wandered hither, possibly, directly across the ocean from its transatlantic home), have been observed by me in this locality only, and this is also the single spot on the European side of the Straits where I have seen *Charaxes Jasius*, L. This last-named butterfly, however, will probably be found in the district not uncommonly, as its food-plant, *Arbutus unedo*, L., is said to grow abundantly in the wooded ravines near Castellar de la Frontera, 17 miles from Gibraltar, whence the fruit is regularly brought to the Gibraltar market by the country-people; and I have also seen the shrub in the woods behind Algeçiras, where several very interesting plants as *Rhododendron ponticum*, L., the "insectivorous" *Drosophyllum lusitanicum*, and the noble fern *Dicksonia culcita*, L. Heritier, have almost their sole European station.

For some five or six miles from the Rock the country is rather bare and monotonous, the roads and cultivated patches being hedged with the prickly pear (*Opuntia vulgaris*) and the *Agave Americana*, both of which New World plants thrive as well here as in their native continent; and except for a few fruit-gardens near the small town of Campamento (3½ miles from Gibraltar), trees are conspicuous by their absence. The isthmus which joins the Rock to the mainland is level and sandy, and not more than ten feet above the sea in any part; and beyond the wretched village of San Felipe de la Linea, just within the Spanish lines, a broad belt of bare sand-hills extends from the Mediterranean beach to that of Gibraltar Bay. These merge gradually into the slopes of the Sierra Carbonera, a range of sandstone hills about 1000 ft. high, running north and south for several miles. Although these hills are now bare of everything except scanty brushwood and the usual aromatic herbage of the Mediterranean region, they are said to have been formerly covered with cork and other trees, which were cut down at the time of the great siege of Gibraltar (1779—1782): a few of the characteristic cork-wood insects (*Lycæna melanops*, *Fidonia plumistaria*, &c., still linger on these hills, as if to bear witness to their former wooded condition. After passing the town of San Roque the country becomes much more varied and luxuriant, though still somewhat arid and sandy in places; and, commencing at nine miles from the Rock, on approaching the valley of the small river Guadarranque, which falls into Gibraltar Bay half-way between Gibraltar and Algeçiras, the fine cork-woods of Almoraima extend for many miles on both sides of the stream, and afford by far the most interesting and productive collecting-ground in the district. Almost equally good ground, of a somewhat similar character, is to be found about four miles inland from Algeçiras, on the lower slopes of the Sierra de la Luna, a range of rugged sandstone hills attaining a height of more than 2000 ft.; but I was able to visit this part on but few occasions, while my almost weekly excursion on foot to the cork-woods during the summer months was invariably a highly enjoyable and successful day's work.

To complete the account of the Spanish localities, the 'Grappler' made two flying visits of three or four days'

duration to Malaga in April and May, 1888. The weather on each occasion was not very favourable, and not much available collecting-ground was to be found; the country west of the town being a flat, alluvial, highly-cultivated plain for the most part, while on the east side the slopes of the rugged limestone hills are almost entirely occupied by vineyards. A considerable number of species of insects was, however, obtained, including several that were either very rare in, or absent from, the Gibraltar district, *Euchloë tagis*, var. *bellezina*, E., and *Pararge mæra*, L., being observed here only.

Passing next to the African side of the Straits, almost exactly opposite "Mons Calpe" at a distance of 13 miles, the second Pillar of Hercules, "Mons Abyla," the modern Djebel Mousa, or "Ape's Hill," rises as a huge rugged dome-shaped mass of limestone (not distinguishable, in hand specimens, from that of Gibraltar) to a height of 2808 ft. I had the good fortune to be enabled to ascend this mountain, from Almanza Bay, on November 4th, 1888, a gloriously clear day, when the view from the summit was one never to be forgotten. The 'Grappler' visited on several occasions a little indentation of the coast called Benzús Bay, about five miles west of Ceuta, and at the foot of the main mass of the mountain: here a rugged and stony, but fertile valley, watered by perennial springs in the limestone, is cultivated by an industrious and peaceable community of Moors, who obtain two and sometimes three crops of wheat, maize, and "dhourra" (*Holcus sorghum*, L.) in the year. A number of interesting insects, not observed at all on the European side, occur at this place. Indeed, the difference between the faunas on the two shores, when the narrowness of the channel separating them and the comparatively recent date which geologists agree in assigning to its formation are taken into account, appears worthy of special attention. The great depth of the Straits (503 fathoms between Gibraltar and Benzús), and the constant strong current from the Atlantic into the Mediterranean, no doubt render them a much more formidable barrier to the passage of living creatures from side to side than would appear at first sight. Although one of the great migration routes of birds actually crosses this narrow sea, there are several species which come right up to its southern shore, and proceed

no farther. Of these the elegant little black-winged kite, *Elanus cæruleus*, Desf., the conspicuous bush-shrike, *Telephonus erythropterus*, Shaw, and *Lxus barbatus*, Desf., the last bird being abundant and somewhat destructive in the orange-orchards of Tangier and Tetuan, may be instanced; but perhaps the most singular case is that of the two ravens, the well-known *Corvus corax*, L., being found sparingly on the European side only, while the smaller and very distinct *C. tingitanus*, Irby, replaces it at Tangier (where it is abundant) and elsewhere in Marocco, but appears never to cross the Straits. It is true that the partridge, *Caccabis petrosa*, Gmel., so common in Marocco, occurs on the Rock of Gibraltar, as does also the monkey, *Macacus inuus*, L., but it is more than probable that both these creatures were originally conveyed there by human agency; the ape is found, in a truly wild state, on the Djebel Mousa. In the land-shells also the same difference is noticed, those from the Djebel Mousa, though closely allied to the Gibraltar species, being mostly distinct; the fine and rare *Helix Scherzeri*, Zélébor, however, seems confined to the summits of the mountains, and *H. Tarnieri*, Morelet, abundant at Tangier, reappears sparingly at Algeçiras and Tarifa. Among the butterflies, *Euchloë eupheno*, L., *Thestor mauritanicus*, Luc., *Lycæna Theophrastus*, F., *Cœnonympha arcanioides*, Pierr. (which comes down to the beach at Benzús Bay), and *Pamphila Zelleri*, Led., appear to be confined to the Maroccan portion of the region, while *Euchloë euphenoides*, Stgr., is an instance of a common Spanish insect which does not cross the Straits. In the Coleoptera, the species which are more or less common on one side, and are apparently not found at all on the other, are too numerous to mention.

Tangier was visited pretty frequently, though never for more than two or three days at a time, and mostly in the winter months: I noted upwards of 30 species of butterflies as occurring there, the most interesting being *Thestor mauritanicus*. Many more probably exist there, as the country is favourable for collecting, and even more varied than that near Gibraltar. To the west of the town, in the direction of Cape Spartel, are undulating downs, attaining in the Djebel Kebir a height of nearly 1200 ft., and covered with a dense uniform "scrub" of aromatic herbs and bushes, among which

the lovely white-flowered *Cistus ladaniferus*, L., is most conspicuous in the early months of the year. The reed-fences enclosing the few cultivated spots support great festoons of *Aristolochia*, *Clematis*, *Smilax*, *Bryonia*, and other climbers, from which many moths may be beaten, and the tall *Eucalyptus* trees in the gardens on "Mount Washington," the hill nearest Tangier in that direction, are, in September, the favourite resort of *Charaxes Jasius*. On the eastern side of Tangier the shores of the Bay are fringed with sand-hills, supporting a scanty growth of *Retama*, &c., and strips of salt-marsh: these rise into low clay hills, with massive fragments of ancient buildings (relics of the old Carthaginian city of Tingis) scattered over them; in part cultivated and strewn with innumerable loose stones, beneath which, in the winter and early spring months, a varied and most interesting coleopterous fauna has its habitat. There is, however, little or no wooded country within walking distance of Tangier, and, owing to limited time and other causes, I did not on any occasion go more than five miles from the town.

From Cape Malabata (the eastern boundary of Tangier Bay) to Benzús the southern shores of the Straits appear somewhat barren and uninviting, and I had no opportunity of landing at any point except once or twice at Almanza Bay, which in general resembles that of Benzús in character, with the addition of a good-sized stream in the valley. The Spanish town and peninsula of Ceuta, which bears a remote resemblance to Gibraltar, though very far inferior in grandeur, was visited by me only on one occasion, when I saw no insects worthy of notice.

Southwards from Ceuta to the mouth of the Bus-feka or Kús River, a distance of about 20 miles, the shore of the Mediterranean Sea is for the most part flat and sandy, with low marshy land between the beach and the hills, which about 6 miles inland attain an elevation of over 2500 ft. A spur of these hills terminates to seaward in the fine bold promontory of Cape Negro, the vertical cliffs of which are over 600 ft. high. Just to the north of Cape Negro is the extensive plain of Buzaghal or Esmir, comprising several square miles of marsh and lagoon, shut off from the sea by a strip of sand-hills about 150 yards wide, through which, in the winter, the

surplus water of the marsh cuts its way in a deep and almost impassable torrent. There is good anchorage (but only in westerly winds) about half-a-mile from the shore, and we made many trips to this spot in the 'Grappler' for the purpose of shooting wild-fowl. This great marsh, covered with dense beds of reeds, bulrushes, and other aquatic plants, and with tangled thickets of tamarisk here and there, is a perfect paradise for water-birds. The open waters of the lagoon are in winter blackened with multitudes of the commoner kinds of ducks, and with two species of coots (*Fulica atra*, L., and *F. cristata*, L.): in autumn the starlings congregate here in flocks of hundreds of thousands, the sound of their wings, heard at a distance of a mile or more, being like that of the surf on a beach; while among the less common birds the elegant marbled duck (*Anas angustirostris*, Mén.), the purple heron (*Ardea purpurea*, L.), the glossy ibis (*Plegadis falcinellus*, L.), and the brilliantly coloured purple gallinule (*Porphyrio cæruleus*, Vand.) find a secure breeding-place among the tangled reed-beds. Once or twice, too, I have here seen the majestic white heron, *Ardea alba*, L., a very rare bird in these parts. As our visits were naturally mostly made in the winter, I did not meet with many Lepidoptera here, but the Coleoptera were always most abundant, and included many of the finest and most interesting forms which I met with in the whole region.

There is a somewhat similar marsh to the southward of the Cape Negro promontory, extending on both sides of the Kús River nearly up to the town of Tetuan, six miles distant from the sea; but this marsh, being more saline in character, is on the whole much less productive in insects than Esmir. To the south and east of Tetuan, the "Riff Coast," of piratical renown, remains practically a *terra incognita*, the fierce and fanatical character of the inhabitants rendering it very dangerous for a Christian to venture among them. A few miles inland the fine range of the Beni Hassan or "Lesser Atlas," whose highest summit, a sacred mountain of the Mohammedans, is partly covered with forest and considerably exceeds 7000 ft. in elevation, will no doubt afford many fine insects when explored, but I believe that up to the present time no European has ever set foot upon it.

I now proceed to enumerate the Lepidoptera met with:—

Papilio podalirius, L. — I have never seen this insect in the vicinity of Gibraltar, but at Malaga, on May 1st, 1888, I took a very fine female specimen of the var. *Feisthameli*, Dup. The var. *Latteri*, Aust., appears to be not uncommon on the African side of the Straits: I have met with it at Esmir in July, and at Benzús Bay and Tangier in August and September.

P. machaon, L.—Very common everywhere on both sides of the Straits; I have taken freshly-emerged specimens on the Rock of Gibraltar from February 18th to the end of October. The larva is, so far as I have observed, as frequently found on rue (*Ruta angustifolia*, Pers.) as on fennel and other *Umbelliferæ*.

Thais rumina, L. — This beautiful butterfly is one of the most characteristic species of the Rock, where it abounds in early spring; it is found throughout the district, being common close to the town of Malaga, and abundant at Tangier. A favourite haunt for the species at Gibraltar is the bush-covered slope at the back of the "Alameda," or public garden, where, in May and June, the curious larvæ may be found commonly on *Aristolochia glauca*, Desf. The earliest date on which I have observed the imago on the wing at Gibraltar is February 8th, and it lasts in good condition until the end of April. The ab. *Canteneri*, Hey., was seen only on April 13th, 1887, on the summit of Peregil Island, a curious little flat-topped limestone rock of about two acres in extent and 250 ft. in elevation, lying about a quarter of a mile from the African shore, almost exactly opposite the Rock of Gibraltar.

Pieris brassicæ, L. — Common everywhere throughout the year. As a rule the specimens are rather smaller than those met with in England, the apex of the primaries is less densely black, and the under side of the secondaries much more dusky in tone, through being more thickly sprinkled with black scales. The larva is very common on *Tropæolum*, as well as on *Cruciferæ*, at Gibraltar.

Pieris rapæ, L.—As common as the preceding, and also on the wing all the year round. Somewhat smaller on the average than British examples, but not otherwise

different. (*P. napi*, L., is said to occur both at Gibraltar and Tangier, but I did not meet with it.)

P. daplidice, L.—Also a generally common insect, but most numerous in the cork-woods of Almoraima, beyond San Roque, where it flies from March to November; on the Rock of Gibraltar I have taken it as early as January 18th. The larva is found on *Biscutella microcarpa*, DeC., and other *Cruciferæ*.

Euchloë belemia, E. — Common in open sunny places throughout the whole region, especially at Gibraltar and the adjacent Spanish district. This butterfly is often to be seen on the wing on fine days even before Christmas (it was common at Tangier on December 9th, 1887), but is most plentiful in February and March. About the end of April the second brood (ab. *glauce*, Hb.) appears, and lasts until the middle of June. It has a very strong, swift, and erratic flight, and is by no means easy to catch. The beautiful pink-striped green larva is found not rarely on *Biscutella* and other *Cruciferæ* (of which it prefers the flowers) in April.

E. belia, E.—Only once found on the Rock of Gibraltar, and quite rare in the adjoining district, where, however, I have seen it as early as January 28th. At Malaga I found it fairly common at the beginning of April, 1888, but I did not observe it at all on the African side of the Straits. The var. *Ausonia*, Hb., was taken at San Roque on March 31st, and at Malaga on April 30th, 1888.

E. tagis, E.—Very common in sunny open spots in the cork-woods in March and April, but not observed elsewhere, except at Malaga, where I found the var. *bellezina*, E., rarely at the beginning of April, 1888. First seen on the wing March 26th, 1887; in its flight it is similar to *E. belia*.

E. cardamines, L. — This species is reported to be not rare in the cork-woods, but I met with it there on only one occasion (April 8th, 1887), when it was quite scarce. The three males then taken are large and fine, but differ very slightly, if at all, from British specimens.

E. eupheno, L.—Restricted to the African side of the Straits, where it replaces *E. euphenoides*, Staud., and is not rare at Tangier and Benzús Bay; I have taken it as early as March 10th at the first-mentioned locality

Its flight is much more powerful than that of its near ally.

E. euphenoides, Staud.—Only found on the European side of the Straits; it is common on the Rock of Gibraltar and at Malaga, and in the cork-woods it forms quite a feature in the scenery on a fine sunny day at the end of March, flitting quietly from flower to flower among the brushwood. The females of this and of the preceding species are much less numerous, or at all events less frequently seen, than their mates; I should put the proportion at about three males to one female observed. The earliest date of its appearance is March 11th (on the Rock), and it remains on the wing until the end of April. The larva I frequently swept off *Biscutella* in May.

Leucophasia sinapis, L. — A common insect in the cork-woods, but not observed anywhere else; it first appears at the end of March (26th), and successive broods occur up to the end of July. It varies greatly in size, as well as in the development of the black apical spot of the primaries, the late summer specimens being very small and faintly marked.

Colias edusa, F.—This is perhaps the most abundant butterfly throughout the entire region, and there is scarcely a fine day in any month on which freshly-emerged specimens may not be seen on the wing. The autumn and winter broods, as a rule, are smaller, paler in colour, and with narrower dark borders than the spring and summer insects. The smallest male specimen I possess, however, was taken at Gibraltar in June, 1887, and measures exactly 1½ in. (38 mm.) in expanse. The next in size, also a male (Gibraltar, February, 1887), measures 1 in. 7½ lin. (41 mm.), and the smallest female (Gibraltar, December, 1889) is 1 in. 10 lin. (46 mm.). The largest male, taken at Algeçiras in June, 1888, is a singularly fine deeply coloured specimen, with abnormally wide and dark borders; this expands 2 in. 3 lin. (57 mm.), and a fine example of the ab. *helice*, Hübn., from San Roque (June, 1888) measures 2 in. 4 lin. (59 mm.). Compared with British specimens, the greater depth and richness of colour of the summer broods of *C. edusa* from the Straits region is very noticeable, and some of the females are very darkly suffused at the bases of the primaries. The ab. *helice*, Hübn., is fairly common, mostly

so in June and forms intermediate between it and the type are occasionally met with. On November 22nd, 1886, I took a very beautiful "gynandromorphous" specimen in the cork-woods, having the right wings male and the left female; this was flying among numerous examples of the ordinary form, apparently, like it, only just emerged from the pupa. On June 6th, 1888, the abundance of this butterfly on the Rock of Gibraltar was so great as to attract general attention, it being visible by hundreds, even in the main street of the town. I have often found and reared the larvæ on species of *Lotus*. (*C. hyale*, L., though well looked out for, did not put in an appearance; it certainly should occur in the region.)

Gonepteryx rhamni, L. — Not seen on the Rock of Gibraltar, but common at San Roque and Algeçiras, also at Tangier, flying with *G. cleopatra;* very large and fine, the males averaging 2 in. 8 lin. (68 mm.) in expanse. First observed June 4th, also in March and April after hibernation.

G. cleopatra, L.—Abundant on the Rock and throughout the Gibraltar district, as well as on the African side of the Straits at Tangier, Benzús Bay, &c.; in May, June, and July, also in early spring (from February 17th) after hybernation. I have taken fresh specimens (in 1887) at San Roque as early as April 30th.

Thecla spini, Schiff.—Not a rare species in the cork-woods; also on the steep bushy slope of the Rock above the Alameda, where it frequents the flowers of a species of *Sedum* (*altissimum*, Poir.), which grows there in plenty. The ab. female *lynceus*, Hübn., is much more common than the type. First seen in the cork-woods, May 14th, 1887.

T. ilicis, E. (var. *æsculi*, O.).—Very abundant in the cork-woods, and also observed at Benzús Bay and Tangier, but not on the Rock of Gibraltar. It flies over the low bushes, and is partial to the flowers of *Scabiosa*, from which it may be taken with the fingers. First observed 14th May, 1887, and lasts until the end of June.

T. roboris, E.—I have only met with this beautiful little butterfly on two or three occasions in the cork-woods, where, in June, it flies round the tops of the tall oaks (*Quercus lusitanica*), usually well out of reach of

any ordinary net; but I have taken the female on flowers in company with *T. spini* and *T. ilicis*. The earliest date on which it was observed is May 31st.

T. quercus, L. — Another somewhat scarce species in the Gibraltar district, having been taken sparingly on *Quercus lusitanica* in the stone-pine plantation (commonly known as the "First Pine Wood") about a mile north of San Roque. First seen July 7th, 1887.

T. rubi, L. — Common near San Roque (apparently not found on the Rock), also at Tangier. At the former locality I have observed it on February 28th; it is quite over by the first week in April.

Thestor ballus, Hübn.—Generally abundant; at Gibraltar it is to be found in March and April in waste flowery places and on the glacis of the fortifications, and it is equally common at Malaga and Tangier. It is very active on the wing, the male especially, and is partial to the flowers of *Fedia cornucopiæ*, DeC., one of the *Valerianeæ* which abounds on the Rock. The male occurred in 1888 as early as February 7th; the female has not been seen before March 9th.

T. mauritanicus, Lucas. — I had the good fortune to meet with this rare and curious little butterfly on April 1st, 1887, at Tangier, when I found it common, but getting somewhat worn, in an exceedingly restricted locality about two miles south-west of the town, near the Guadalhorce or "Jew's River." I again found it in 1888 on March 10th, and in 1889 on March 23rd, in the same spot—a space not 30 yards square, beyond which not one was to be seen, in the midst of miles of precisely similar scrub-covered country. The male flies close to the ground, and for a short distance only at a time, much less rapidly than its congener *T. ballus:* it invariably settles on the bare spots of ground among the low bushes, where it is easily caught. The female is either much scarcer, or flies less readily than the male, as I have taken only one female to about seven males.

Polyommatus phlæas, L. — Very abundant everywhere throughout the year, especially the summer form *eleus*, F.; the autumn and winter specimens are very brightly coloured, the var. *eleus* being met with from April to September.

Lycæna bœtica, L. — Common almost all the year throughout the Straits region, being often seen in the

Alameda at Gibraltar. I have records of its appearance from February 28th to October 30th.

L. telicanus, Hübn.—More abundant than the last, and generally distributed; it is very plentiful in the marshy hollows or "sotos" in the cork-woods, and on the borders of the Esmir lagoon in Marocco. March 26th to the end of October.

L. theophrastus, F.—I met with one female specimen of this pretty little insect (of which I can find no previous record from Marocco) on the borders of the lagoon at Esmir, on July 25th, 1888.

L. baton, Berg., var. *panoptes*, Hübn.—Fairly common in May, 1888 (first observed on the 8th), on the lower slopes of the Sierra Carbonera, about two miles from the Rock of Gibraltar, frequenting dry flowery banks. I did not see it elsewhere, nor did I meet with the type-form.

L. lysimon, Hübn. — Scarce near Gibraltar; I took a few rather worn specimens in a sandy waste field at Campamento, three miles from the Rock, on August 17th, 1887. I have also met with it at Esmir and near Tetuan, Marocco, in November.

L. astrarche, Berg.—Very common everywhere, almost all the year round; I have seen it on the wing on February 21st. Rather larger and brighter than English specimens, the orange spots always very well marked (especially in the female), and the ground colour of the under side of the wings warm ochreous-brown.

L. icarus, Rott. — Exceedingly abundant and very variable in size and colour. Some of the males are very bright, and have a submarginal row of small black dots on the upper side of the secondaries; the females, as a rule, are much more blue above than English specimens. In the middle of summer very small examples occur, not exceeding $8\frac{1}{2}$ lin. (18 mm.) in expanse, the males having a series of faintly indicated submarginal orange dots on the upper side of the secondaries, the females very dark, with little or no blue. Flies from February 12th to November. The var. *icarinus*, Scriba, occurs rarely.

L. bellargus, Rott. — Found rarely near San Roque (April 30th, and again in July, 1887) also at Malaga. Summer specimens of the male have a submarginal row of bright orange dots on the upper side of the secondaries.

L. argiolus, L.—Generally common; I have seen it on

the Rock (where the larva may be found on the blossoms of ivy) as early as January 12th, but it is most plentiful in June and July.

L. minimus, Fuess., var. *Lorquinii*, H.-S. — Only met with by me on one occasion (May 16th, 1887), when I took a few examples of both sexes in beautiful condition, in a ravine close to the shore of Cabrita Point, about two miles south of Algeçiras.

L. melanops, Bdv. — Locally abundant in open places in the cork-woods, where its food-plant, *Dorycnium suffruticosum*, grows; also on the Sierra Carbonera near San Roque, and at Malaga. It frequents the flowers of various species of *Erica*, and is on the wing from April 12th to the middle of May.

Charaxes jasius, L.—I have only twice seen this noble butterfly on the European side of the Straits, on both occasions in the Alameda at Gibraltar, on June 2nd and October 7th, 1888. At Tangier, in September of the same year, it might almost have been called abundant in the lanes and gardens to the west of the town, beyond the "Jew's River." It is a grand sight to see three or four of this splendid insect wheeling round the top of a tall "blue-gum" tree, occasionally, though but seldom, descending to alight on a twig within reach of the net, though even then it is not easy to approach. Over-ripe figs are, however, a great attraction to it. The largest and finest female I obtained (measuring 4 in. 3 lin.= 108 mm. in expanse) was taken on the stem of a plum-tree from which a little gum was oozing. I did not meet with the larva at Tangier, as I was too busy with Coleoptera to look for it when it was feeding in early spring; the food-plant, *Arbutus unedo*, L., abounds near Tangier, but is not found within many miles of Gibraltar. I have taken the butterfly (much worn) at Benzús Bay on August 28th, and have seen it at Esmir in October. It also occurs at Ceuta.

Vanessa polychloros, L.—Not common; taken at San Roque on June 9th, 1887, also met with on the Rock of Gibraltar, and in the Alameda at Algeçiras. On the African side I have seen it at Benzús Bay. It is rather more plentiful after hibernation in March and April.

V. atalanta, L.—Generally common, but not abundant, throughout the entire region. Flies all the year round.

V. cardui, L.—Very plentiful everywhere during the

summer, and fresh specimens are occasionally to be met with in the winter months; these are usually small and very darkly coloured.

Melitæa aurinia, Rott., var. *Desfontainii*, Godt.—I shall not readily forget my astonishment at meeting with this butterfly—for which I had been vainly scouring every accessible marshy place for at least ten miles round—on a steep, arid, bushy slope of the Rock of Gibraltar, within a stone's throw of the main road, and barely 300 yards from the town walls. I first saw it on May 27th, 1888, and managed during the following week to obtain a small series, not without a good deal of trouble, as the insect flies very strongly, and the nature of the ground it frequents renders its pursuit a matter of difficulty. It is not easy to realise that these large richly-coloured insects (my largest female measures in expanse of wing 2 in. 3½ lin. = 57 mm.), and the little pale washed-out looking alpine *merope*, Dup., of which I have specimens barely 1 in. 3 lin. (= 34 mm.) in expanse, are but forms of one variable species.

M. phœbe, Kn., var. *ætheria*, Hübn.—Common in the cork-woods, frequenting the same localities as *Lycæna melanops*, and on the wing at the same time, from April 30th to the end of May. No second brood observed. The specimens are very fine and large, averaging 2 in. 2 lin. (= 55 mm.) in expanse.

Argynnis latona, E. — Apparently very rare; I took one specimen by the roadside at Campamento on June 18th, 1887, and have seen one or two more caught near San Roque.

A. pandora, Schiff. — Very sparingly observed in the cork-woods (May 28th, 1887), and near San Roque (July 7th, 1888); also taken at Benzús Bay in August, and seen at Tangier in September. It must, however, be common somewhere in the neighbourhood of Gibraltar, as on September 19th, 1888, quite a large number suddenly appeared on the Rock after the prevalence of a fresh westerly breeze, and were seen for a fortnight afterwards, frequenting flowers of heliotrope, &c., in the Alameda. All were males, so far as I could ascertain, and all in exceedingly worn condition.

(*Anosia plexippus*, L.).—This wandering butterfly was taken by Lieut.-Commander Cochran, of H.M.S. 'Grappler,' in his garden at Rosia, Gibraltar, on October 24th,

1886 (*vide* Entom. Monthly Mag., vol. xxiii., p. 162), and was seen shortly afterwards by me, it being then only just dead. I kept a special look-out for it during the whole of my stay at Gibraltar, but did not see or hear of another specimen.

Melanargia ines, Hfsgg. (*thetis*, Hübn.). — Only one specimen of this pretty species, a female in very fine condition, taken in the cork-woods on May 21st, 1887. I saw it commonly at Malaga when I was there in H.M.S. 'Swiftsure' in April, 1876, and on my visit to the same place in May, 1888, obtained a few beautiful specimens (all males) on a bare limestone hill-top about two miles east of the town. It is said to occur abundantly at Gaucin, 25 miles north of Gibraltar.

Satyrus statilinus, Hufn., var. *allionia*, F.—Abundant in the stone-pine plantations beyond San Roque, and in the cork-woods, but not found on the Rock of Gibraltar; in Marocco I have observed it at Benzús Bay. It is very fond of settling on the trunks of the cork-trees, and is to be taken in good condition from July 2nd to the end of August. I have seen worn stragglers in the cork-woods as late as October 29th. Usually very large and well-marked, averaging 2 in. 6 lin. (= 63·5 mm.) in expanse of wing.

S. fidia, L.—This fine species is very common on the Rock of Gibraltar, being often seen on the main road settled on horse-droppings, or coming down from the slopes above when the road is watered, as it is every day about 3 p.m.; it is then most easily taken, as the ground it usually frequents is very rough and impracticable. The specimens are larger and finer than those I have seen from South France, the female often attaining an expanse of wing of 3 in. (= 76 mm.). The earliest date on which I have observed it (in 1888) is June 16th, and it continues on the wing until the end of August. I have taken it sparingly in the cork-woods, and in Marocco at Benzús Bay. Its flight is powerful, and it is rather shy.

Pararge mæra, L., var. *adraste*, Hübn.—Only met with at Malaga, and there but rarely, on April 5th, 1888.

P. megæra, L.—Very abundant everywhere throughout the Straits region, and on the wing almost all the year round; I have notes of its appearance from January 28th to the end of October. Perhaps slightly paler

in tone than British examples, but not otherwise different.

P. ægeria, L.—As plentiful as the last species, and found everywhere throughout the year. Always of the dark type-form, which I have also taken at Ferrol, on the north coast of Spain.

Epinephile janira, L., var. *hispulla*, Hübn.—Abundant everywhere in the open country from May 7th to the end of August. The type-form not met with.

E. ida, E.—One of the commonest butterflies, frequenting open bushy places throughout the region. First observed May 12th, 1887, and I have seen the females in good condition in the middle of September.

E. pasiphaë, E.—Also very common and generally distributed, and found in the same situations as the last; it abounds on the slopes of the Rock of Gibraltar (where I have observed it on April 25th) at San Roque, Malaga, Tangier, and Benzús Bay. Unlike *E. ida*, it lasts but a short time, being quite over by the middle of June.

Cœnonympha arcanioides, Pierret.—Found only in Marocco, where it is common throughout the summer in dry bushy situations. At Tangier I have taken it as early as March 10th; it also occurs at Esmir and Benzús Bay.

C. dorus, E.—Locally common on the downs beyond San Roque, and on open hill-sides in the cork-woods; also at Benzús Bay, but apparently rare there. June 24th to the end of July.

C. pamphilus, L.—Quite a rarity; found on the Rock of Gibraltar in May, 1887, and near Tetuan on June 20th, 1888. Both these specimens are richly marked, and the Tetuan example has well-defined dark borders to all the wings above, but they do not exceed English examples in size.

Spilothyrus alceæ, E.—Rare. Taken near Cabrita Point, May 16th, and at San Roque on June 18th, 1887.

S. althææ, Hübn.—Common everywhere almost all the year. Taken on the glacis of the fortifications at Gibraltar on March 14th, 1888, and as late as November 20th at San Roque.

Syrichthus proto, E.—Very common and generally distributed. There appear to be two broods, the first appearing in May (10th), the second, which is more numerous, in July, and continuing on the wing until the

end of September. The larva was found plentifully at Malaga at the end of April, 1888, between united leaves of *Phlomis purpurea*, L.

S. fritillum, Hübn.—Locally common in a waste field by the side of the main road between Campamento and San Roque, but not seen elsewhere. First found July 13th, 1887, and again on May 22nd of the following year.

S. sao, Hübn., var. *therapne*, Rbr.—Common near San Roque in dry waste places, frequenting the flowers of thyme, &c.; also sparingly in the cork-woods, at Tangier, and at Esmir. Double-brooded, appearing in April (16th) and May, and again in July, the second brood being the more common. I took a fine freshly-emerged example at Esmir as late as November 3rd, 1888.

Hesperia thaumas, Hufn. — Generally abundant throughout the Gibraltar district (except on the Rock, where I have never seen it), as well as at Tangier, in dry open places. May 10th to the middle of June.

H. actæon, E.—Also plentiful at Campamento, San Roque, and other places near Gibraltar, but not on the Rock, and I have no record from Marocco; it is always found in damp situations. May 10th to the middle of June.

H. nostradamus, F.—Common in the Gibraltar district, being often taken on heliotrope flowers in the Alameda; also at Tangier (where I first observed it on June 11th, 1887), Benzús Bay, and Esmir. It is most plentiful in August and September, and frequents the hottest and driest situations.

H. Zelleri, Lederer.—This little skipper is found only on the African side of the Straits. My first specimen was taken at Benzús Bay on August 30th, 1887, and I subsequently met with it in a damp spot among the sand-hills about a mile east of Tangier on September 19th, and again in some numbers on the edge of the Esmir lagoon on October 1st. In the following year I took it again at Esmir on July 25th, and in good condition as late as November 10th. The flight of this butterfly is much less rapid than that of its near ally, *P. nostradamus*, and it appears always to be found in moist places, or at any rate, never very far away from water; at Esmir the yellow flowers of *Inula viscosa*, Ait., are its great attraction. The original record of this species (Lederer, Verh. Zool.-bot. Ges. Wien, 1855, p. 194) gives Syria as its habitat. I can find no record

from any other country, and its occurrence in so distant a locality as North Marocco is very interesting. Specimens of *H. Zelleri* in the National Collection agree in every particular with my insect.

Smerinthus populi, L.—I found the remains of this insect at Benzús Bay, May 5th, 1888; living examples were not met with.

Acherontia atropos, L.—Imago of occasional occurrence. Larvæ found once or twice by me at Gibraltar, on the thorny *Solanum Sodomæum*, Willd.

Sphinx convolvuli, L.—Apparently not common; occasionally found at flowers. I have only seen one or two specimens at Gibraltar.

Deilephila euphorbiæ, L.—Not seen in the perfect state, but the larvæ were not uncommon on the Neutral Ground at Gibraltar, and in the cork-woods. I have seen them in June and October.

D. livornica, L.—This species is said to be common in some summers at the flowers of *Plumbago capensis*, *Pelargonium*, &c., at Gibraltar and Tangier. I have only one specimen, however, from the former locality.

Chærocampa celerio, L.—Not uncommon in September and October at the flowers of *Plumbago capensis*, &c., at Gibraltar; also occasionally found at rest on walls, &c.

Pterogon proserpina, Pall.—I have not met with this insect in the perfect state, but the larvæ were found in considerable numbers near Campamento, on *Œnothera biennis*, in June, 1888.

Macroglossa stellatarum, L.—Abundant everywhere all through the year; I saw it commonly on the Rock of Gibraltar on Christmas Day, 1886, busily engaged at the wild flowers, of which I remember counting no fewer than thirty species in bloom on that day.

Sciapteron tabaniforme, Rott.—Scarce. A fine pair taken on white poplar on the Rock of Gibraltar July 8th, 1887.

Sesia Ramburi, Staud.—Not very uncommon on the flowers of thyme, wild carrot, &c., on the downs beyond San Roque, in June.

Paranthrene tineiformis, E.—Found with the preceding, but much less common; also taken on the Rock of Gibraltar. June.

Zygæna sarpedon, Hübn.—Not common. Taken on the Sierra Carbonera, May 8th, 1888; also at Algeçiras and Benzús Bay in June.

Z. stœchadis, Bork. — Locally plentiful in marshy places. Cork-woods, June 4th, 1887; Benzús Bay, June 25th, 1888.

Z. lavandulæ, E. — This very beautiful insect has occurred to me only in one little spot, a sunny bank about a mile north of the town of San Roque, on the way to the cork-woods. I found it here not uncommonly on May 7th, 1887, and again on May 10th, 1888. It flies rather actively in the bright morning sunshine.

Z. bœtica, Ramb. — Exceedingly abundant in the Alameda of Gibraltar, and other places on the rock; also on the Neutral Ground. The larva feeds on the handsome yellow-flowered *Coronilla glauca*, frequently stripping the bushes of their foliage, and the moth is double-brooded. The specimens of the first brood, which appears in May (being observed on the 18th of that month in 1887), are much finer and larger than those of the more numerous second brood, which emerge in August and September. The cocoon is smooth, oval, and white, and not a little resembles a lizard's egg.

Nola cicatricalis, Treitschke.—One or two found on tree-trunks in the cork-woods in April, and at rest on lichen-covered boulders on the Rock of Gibraltar in October.

Emydia cribrum, L., var. *candida*, Cyrill.—Not uncommon. Taken on gas-lamps at Gibraltar, among grass at Campamento, and in heathy places in the cork-woods. May, and again in August and September.

Deiopeia pulchella, L.—Abundant everywhere, and to be met with throughout the year, though most plentiful in early summer. On May 14th, 1887, I saw it in vast profusion at the edge of the cork-woods, every step that I took disturbing scores of examples. Larva on *Heliotropum europæum*, *Echium*, and other *Boragineæ*.

Euchelia jacobææ, L.—Locally common near Campamento in June; the larva found in plenty on ragwort.

Euprepia pudica, L.—Occasionally found at rest at Gibraltar and Tangier. The larva is not uncommon, but it feeds up very slowly, and is not easy to rear. The imago appears in August and September.

Arctia villica, L.—Not common. Found near Campamento in March and April, and the larvæ and pupæ are occasionally met with in early spring. The specimens

are much larger and finer than English examples; they expand 2 in. 9 lin. (= 69·6 mm.).

A. casta, E.—I found only one example of this beautiful little tiger-moth, at rest on the ground near San Roque, on April 12th, 1888.

Phragmatobia fuliginosa, L.—Only observed in Marocco, at Esmir, and in the marshes near Tetuan, where the cocoons are to be found not uncommonly in the winter, spun up on the rushes. The specimens bred from these are remarkably large and brightly coloured, on an average measuring 1 in. 6½ lin. (= 39 mm.) in expanse.

Orgyia Josephinæ, Oberth. ('Etudes d'Entomologie, Lép. d'Algerie,' vol. 6, div. iii., p. 77, and plate ii., fig. 5, ♂).—This very beautiful and interesting species was described by M. Oberthür from specimens obtained at Lake Sebgha, in Algeria, by M. Austaut, in April, 1880. I found it at Esmir under the same circumstances as the preceding species, but only bred two males from a good many cocoons collected; the wingless females, which are covered with ashy-grey woolly hairs, appear to be much more numerous.

O. trigotephras, Bdv. — Common on the Rock of Gibraltar, at Tangier, and Benzús Bay, in June. In its habits it exactly resembles *O. antiqua*, flying actively by day.

Ocneria dispar, L. — Not common on the Rock of Gibraltar, and in the cork-woods of Almoraima, but observed in all its stages in most astonishing profusion at Monte de la Torre, about four miles from Algeçiras, on June 28th, 1888 (*vide* Entom. Monthly Mag., vol. xxv., p. 65).

O. atlantica, Ramb. — One female of this interesting species was found at rest on a stone wall at Gibraltar, July 5th, 1887.

Porthesia auriflua, L.—Not uncommon at Gibraltar and San Roque in June. The black dots on the primaries, occasionally developed in English examples, are very conspicuous in these specimens.

Cossus ligniperda, L. — Not common. The larva observed in elm and poplar trees at Campamento.

Zeuzera æsculi, L. — Found once on the Rock of Gibraltar, June 11th, 1887. A large and well-marked female specimen.

Saturnia pyri, L. — Apparently common throughout the region. I have had many specimens brought to me at Gibraltar in April and May, and have found the cocoons at Tangier in the winter. On June 28th, 1888, I observed the full-fed larvæ in large numbers on willow-bushes and fruit-trees at Algeçiras.

S. carpini, L. — Only met with in the cork-woods, where it is very abundant at the end of March (the earliest date on which I have seen it on the wing being the 6th). The larva is also common there in May on a variety of plants, but it appears to have a preference for the yellow-flowered *Helianthemum halimæfolium*.

Lasiocampa trifolii, L.—Not often seen on the wing, but common in the larva-state at Gibraltar and Tangier; at the latter place feeding chiefly on the single-seeded white broom, *Retama monosperma*, L. I have taken the male imago at gas-lamps in September at Gibraltar.

Clisiocampa neustria, L.—Common in the larva-state at Gibraltar, and near Algeçiras I have seen the oaks almost defoliated by the ravages of the larva in the beginning of June. The imago appears about the 20th of that month.

Megasoma repandum, Hübn.—This fine moth appears to be not uncommon at Gibraltar, also at Esmir, the larvæ feeding on various *Leguminosæ*. I found a female on the Rock of Gibraltar on August 6th, 1888, which laid a few eggs; the larvæ resulting from these fed up well on *Lotus*, and produced fine imagos in November. I also obtained a pupa at Esmir on March 1st, 1889, from which a very fine dark-coloured female emerged on the 20th of the same month.

Pygæra bucephala, L.—Found in the larva-state on oaks (*Quercus lusitanica*) near San Roque; also pupæ in the sandy soil at the foot of these trees. Imago bred March, 1888; these were very large and fine, the expanse of wings being quite 3 in. (76 mm.).

Cerura vinula, L.—The cocoons (mostly empty) of this moth were not rare on poplar-trunks at Tangier, but only one imago was bred (May, 1888). This is a small and very darkly suffused male, bearing a close resemblance to specimens of *D. menciana*, Moore, from the Himalayas, in the National Collection.

C. bifida, L. — Occasionally found in the larva-state, or drying its wings on the trunks of poplar-trees, on the

Rock of Gibraltar, in August. These specimens are very dark, and are probably the var. *urocera*, Bdv.

Raphia hybris, Hübn.—Found once or twice drying its wings on poplar-trunks at Gibraltar in August, 1887, and at Campamento in April, 1888. The pupa was also found under bark of Lombardy poplar at San Roque in the winter of 1887–8.

Acronycta psi, L. — A larva of this species, found feeding on *Arbutus unedo* at Tangier in November, 1886, produced a very large and clearly marked imago in the following April.

A. rumicis, L. — Pupæ not uncommon, spun up on rushes, on the borders of the Esmir lagoon in winter, the imago appearing in February.

Bryophila muralis, Forst., var. *par*, Hübn.—Found at rest on walls and tree-trunks, Rock of Gibraltar, but scarce. July.

B. ereptricula, Treitschke.—More plentiful than the preceding, occurring on walls at Gibraltar and Campamento in August and September. The orange-spotted larva observed in the spring months.

Tapinostola musculosa, L. — Not common. Found on flowers of *Scabiosa*, *Centaurea*, &c., by the roadside near San Roque in May.

Leucania Loreyi, Dup. — Fairly common on ivy-blossom in the Alameda at Gibraltar in October.

L. l-album, L.—Occurs with the preceding, but much scarcer. October and November.

Caradrina exigua, Hübn.—Not rare at ivy-blossom, &c., at Gibraltar ; also at Tangier. October, and again in spring.

C. ambigua, W. V. — Also on ivy-blossom in October, but less common than the preceding. Gibraltar.

Pachnobia rubricosa, W. V. — One specimen picked up at rest in the village of Campamento, in May, 1888. This is smaller and more obscurely marked, but more brightly coloured, than any British specimen I have seen.

Orrhodia erythrocephala, W. V. — I refer with considerable doubt to this species a moth taken on ivy-bloom at Gibraltar in October, 1887.

Triphæna pronuba, L.—Occurs throughout the summer, but can scarcely be called a common insect. Gibraltar and Tangier.

Agrotis Dahlii, Hübn. — Rare; on ivy-blossom at Gibraltar, November, 1887.

A. saucia, Hübn.—Not uncommon, and appears to be found almost all the year. Gibraltar and Tangier.

A. leucogaster, Freyer. — One specimen of this pretty species, bred from a pupa found in some flood-refuse near Tetuan. February, 1889.

A. puta, Hübn.—Not common. Taken at ivy-bloom at Gibraltar in October.

A. segetum, W. V.—A fairly common but not abundant insect, at ivy-bloom at Gibraltar. October and November.

A. spinifera, Hübn.—Found occasionally on the Rock at ivy-bloom in October, also met with in February; it is, however, more plentiful among coarse grass and herbage at La Tuñara, on the "Eastern Beach" (of the Mediterranean), three miles north of Gibraltar, in October. Some very richly-marked specimens were taken on the Tangier sand-hills in September, 1888.

A. ypsilon, Rott. (*suffusa*, Hübn.).—Not common; on ivy-blossom at Gibraltar, in October.

A. crassa, Hübn. — Rare; one or two worn specimens at light, and disturbed from among herbage, in September. Gibraltar.

Brithys pancratii, Cyr.—Not taken in the perfect state, but the conspicuous white-spotted black larvæ were abundant on the leaves of the beautiful and fragrant sea-lily (*Pancratium maritimum*, L.), which grows on every sandy beach throughout the region, just above the reach of the waves. These larvæ are to be found almost all the year round, and I bred the imago in November and February.

Dryobota saportæ, Dup.—A fairly common insect at Gibraltar on ivy-blossom. October and November.

Mamestra serena, W. V. — Once bred from a pupa picked up on the Rock of Gibraltar, March, 1888: a dark and suffused specimen closely approaching the var. *corsica*, Ramb.

M. dysodea, W. V. — One or two specimens found at rest on stones, &c., on the Rock. April.

M. oleracea, L.—Not common. Bred from pupa, also on ivy-blossom at Gibraltar, in October.

Trigonophora flammea, E.—A fine specimen, taken on ivy-bloom at Gibraltar, November, 1887.

Habryntis meticulosa, L.—Not rare, and found throughout the year, though most frequently seen on ivy-bloom. Gibraltar and Tangier.

Eriopus Latreillei, Dup.—The larvæ of this species were found feeding on ferns in a garden at Gibraltar, and several imagos were bred. October, 1887.

Calocampa vetusta, Hübn.—One specimen only, on ivy-bloom at Gibraltar, in October, 1887.

Calophasia platyptera, E.—One only, taken at Tangier, September, 1887.

Cleophana antirrhini, Hübn.—San Roque. Found rarely on flowers by day. May, 1887.

C. yvanii, Dup.—Only once taken, in the cork-woods, in May, 1887.

Cucullia verbasci, L.—Not found in the perfect state, but the larvæ are common in May on *Verbascum sinuatum*, L., and other plants of this genus, throughout the Gibraltar district. Imago bred in April: very dark.

C. chamomillæ, W. V.—I have only one note of the occurrence of this species, in the larva-state at Gibraltar, March, 1887.

Eurhipia adulatrix, Bdv.—Apparently rare; one or two worn specimens taken at Gibraltar, and a fine example found in the sweeping-net, at Tangier, September, 1888.

Heliothis armigera, Hübn.—Not common. Found on the beach at La Tuñara, October, 1887.

H. incarnata, Fr.—Also scarce. One example in the cork-woods, May, 1887, and another near Algeçiras in July, 1888.

H. peltigera, W. V.—Tolerably common, at Gibraltar and Tangier, from May to July.

Plusia chalcites, E.—A specimen of this pretty species was bred from a pupa found in a garden at Gibraltar, October, 1888; it has also occurred there at light.

P. gamma, L.—Common, but not abundant, throughout the region; chiefly in the early spring months.

Acontia luctuosa, W. V.—Fairly plentiful in weedy places, and at flowers of wild mint and thyme by day, from May to September. Generally distributed.

A. lucida, Hübn., var. *albicollis*, F.—Rare; one at Campamento in May, 1887, and a beautiful specimen at Tangier in February, 1888.

Catocala elocata, E.—Several specimens of this species

were taken at rest on walls, &c., at Tangier, September, 1887 and 1888.

C. dilecta, Hübn.—A larva found feeding on *Quercus lusitanica* at Algeçiras on June 4th, 1888 (which, for want of a suitable box, I was obliged to carry on board the ship loose in my pocket), produced this fine moth on July 13th.

C. promissa, W. V. — Rare; one specimen taken at Monte de la Torre, near Algeçiras, June 28th, 1888.

C. conversa, E.—Common in June in the cork-woods, and near Algeçiras; usually at rest on the trunks of the cork-trees.

C. nymphagoga, E.—Found with the preceding; perhaps less common, but observed in numbers at Monte de la Torre on June 28th, 1888. [On this day I took a single specimen of a small *Catocala*, which I have as yet been unable to identify; but from its lacking the central black band on the yellow secondaries, it would appear to be referable to the American genus *Allotria*.]

Cerocala scapulosa, Bdv.—Found occasionally in sandy places in the cork-woods, flying by day among *Helianthemum halimæfolium*. April and May.

Ophiusa bifasciata, Petagna. — One specimen of this pretty and curiously marked moth was taken at Tangier, September 7th, 1888.

O. algira, L.—Also rare. Taken at San Roque, June 28th, 1887, and observed at Tangier.

Pseudophia lunaris, W. V. — Very abundant in the larva-state on low oak-bushes in the cork-woods in May. Imago less plentiful, but still not rare, and easily disturbed by day, in April. Bred March 13th, 1888.

P. tirrhæa, Cr.—A larva found feeding on a South American tree, *Schinus molle*, at Gibraltar in November, 1886, produced a fine female imago, February 21st, 1887.

Spintherops spectrum, F.—The very beautiful larvæ of this moth were not rare on a few bushes of *Retama* near the foot of the Sierra Carbonera in May. Some fine specimens bred, June, 1887.

Emmilia trabealis, Scop. — Apparently rare; found near Campamento, August 23rd, 1887.

Prothymia coniocephala, Staud. — One specimen taken near San Roque, July 29th, 1887.

Trothisa ostrina, Hübn. — Generally distributed, and common in dry places. Found from April to October.

T. parva, Hübn.—Equally common with the preceding. Perhaps most plentiful in August.

Metoptria monogramma, Hübn.—A common species on the Rock of Gibraltar, and also observed at Malaga. It has the habits of an *Euclidia*, and flies actively by day among its food-plant, *Psoralea bituminosa*, L. April 14th to end of May.

Herminia crinalis, Tr. — Not uncommon at Gibraltar on ivy-blossom in October, but usually in worn condition.

H. lividalis, Hübn.—A common insect on the Rock of Gibraltar, and at Tangier, among weeds (*Parietaria*, &c.). June and October.

H. obsitalis, Hübn.—Not rare on the Rock; usually disturbed out of dark corners. September and October.

Eugonia quercaria, Hübn. — One specimen taken in the cork-woods, June 28th, 1887.

Aspilates ochrearia, Rossi.—Not uncommon at Gibraltar, and usually very large and fine. I have a male specimen taken in April, 1887, which measures 1 in. 6 lin. (= 38 mm.) in expanse.

? Pseudosestra obtusaria [*Lozogramma obtusaria*, Walk., Cat. Lep. Het., Geometrites, xxiii., p. 985 (1861)].—A single specimen of a Geometer, taken by beating the undergrowth in a stone-pine plantation about two miles north of San Roque on March 19th, 1888, is perhaps the most remarkable capture in the region, as it appears to be identical with *Lozogramma obtusaria*, described by Walker from New Zealand, and apparently not known from elsewhere. Of this moth there are eight examples in the National Collection, with which the San Roque insect agrees in all particulars, except that (being fresh and in good condition) it is rather brighter and more clearly marked than any of these specimens, all of which are slightly worn and faded. After a careful comparison of the Spanish insect with the New Zealand type by Mr. Butler and myself, we can come to no other conclusion than that they belong to one and the same species.

Ligia opacaria, Hübn.—Once taken in the cork-woods, among *Erica*, October 29th, 1887.

Terpnomicta dilectaria, Hübn.—One very small specimen, apparently of this species, at Tangier, in September, 1887.

Abraxas pantaria, L.—Exceedingly abundant in all its stages on the ash-trees in the Alameda at Gibraltar,

which are frequently stripped of their leaves by the prettily-coloured larvæ. It also occurs plentifully at San Roque, Esmir, &c.; in fact wherever there are ash-trees. The moths of the first brood, appearing in April, are much larger than those of the second brood, on the wing in July.

Selidosema plumaria, W. V.—Common throughout the summer and autumn at Campamento and San Roque, in dry bushy situations. Very much smaller than specimens from the South of England.

Thamnonoma gesticularia, Hübn.—A not uncommon species in the cork-woods in May and June; easily disturbed by day.

Fidonia plumistaria, Vill.—This handsome and conspicuous Geometer is not rare in some heathy localities in the cork-woods, flying in the hot sunshine in April; also on the summit of the Sierra Carbonera, where, in 1889, I met with it as early as March 26th.

Gnophos respersaria, Hübn.—Occasionally found in dry stony spots in the cork-woods in June. I have also seen it on the Rock.

G. mucidaria, Hübn.—Not rare on the Rock of Gibraltar, where it comes to the gas-lamps in October.

Boarmia rhomboidaria, W. V.—Taken at Algeçiras on June 28th, 1888. Apparently rare.

Pachycnemia hippocastanaria, Hübn.—Occasionally in heathy places in the cork-woods in May.

Anthometra plumularia, Bdv.—Not rare in June on the borders of the cork-woods, flying in the sunshine over low bushes of *Calycotome spinosa* and other thorny *Leguminosæ*.

Nemoria herbaria, Hübn.—One specimen taken at light at Gibraltar, October, 1888.

Acidalia (*Cleta*) *vittaria*, Hübn.—Taken at Algeçiras, flying by day, April 23rd, 1887; also near Campamento in June.

A. ochrata, Scop.—Plentiful in dry grassy places, near Campamento and elsewhere, in June.

A. perochraria, Rössl.—Found with the preceding, but less common. June.

A. nexata, Hübn.—This very minute but pretty Geometer is apparently not rare near Campamento, flying by day in moist places with *A. vittaria*. June and October.

A. virgularia, Hübn.—A very plentiful species on the Rock of Gibraltar, where it comes freely to gas-lamps. Most common in October.

A. elongaria, Ramb.—Rare; one specimen at Campamento, May, 1887.

A. circuitaria, Hübn.—I have an example of this species, taken at Benzús Bay in June, 1887.

A. ostrinaria, Hübn.—Occasionally taken in the cork-woods, in June.

? A. transmutaria, Ramb.—One specimen, apparently referable to this species, taken at San Roque, June, 1887.

A. promutata, Guén.—Found at rest occasionally on stones, &c., in July. Rock of Gibraltar.

A. luridata, Zell.—Taken at a gas-lamp at Gibraltar, September, 1887.

A. emutaria, Hübn.—Rare; one specimen at Esmir, November 3rd, 1888.

A. imitaria, Hübn.—Also rare; found on the Rock of Gibraltar, July 18th, 1887.

A. ornata, Scop.—Not rare, in dry flowery places at Campamento and San Roque, from May to August; also taken at Esmir.

Pellonia calabraria, Zell.—Tolerably common in the cork-woods, and on the Sierra Carbonera, at the end of April and in May; a day-flyer.

Zonosoma pupillaria, Hübn.—Beaten out of oak in the cork-woods in July, 1887.

Z. porata, F.—Rare; taken near San Roque in July, 1887.

Sterrha sacraria, L.—A generally abundant insect throughout the region, and found during the greater part of the year. Very variable.

S. consecraria, Ramb.—One specimen of this pretty little moth picked up in the town of Gibraltar, October 9th, 1888.

Anaitis plagiata, L.—Not uncommon on flowery banks near San Roque, in May and June; the specimens resembling those of the second brood in England.

Chesias oblata, F. (*obliquaria*, W. V.).—Apparently rare; taken at Campamento in March, 1888.

C. griseata, W. V.—Also a rarity; one found at Gibraltar in May, 1887.

Ortholitha peribolata, Hübn.—Not uncommon in the cork-woods, among *Erica*, on October 29th, 1887.

Phibalapteryx fluviata, Hübn. — Occasionally found singly, at almost all times of the year, at Gibraltar; also taken at Esmir, November, 1888.

Larentia fluctuata, L.—Our familiar "garden carpet" is by no means a common insect at Gibraltar, but it sometimes occurs at the gas-lamps, and at rest on walls, chiefly in the autumn months.

L. basochesiata, Dup.—Occasionally, but rarely, taken at gas-lamps, &c. One of the first moths noticed on the Rock of Gibraltar, October 23rd, 1886.

L. bilineata, L. — A scarce and local insect in the cork-woods. July.

Eupithecia centaureata, W. V. — Not uncommon at light, &c., on the Rock in spring and autumn.

E. satyrata, Hübn. — Occasionally found in the cork-woods, among heath. May and June.

E. pumilata, Hübn.—Tolerably common at Gibraltar in spring and autumn; also at Tangier in March. More uniform in colour than English specimens.

Cledeobia connectalis, Hübn.—Tolerably common in dry grassy places at Campamento and elsewhere. June.

Stemmatophora gadesialis, Ragonot. — One example, taken at San Roque, July, 1887.

Scoparia angustea, Steph. — At rest on walls, &c., Gibraltar and Campamento, in October; not rare.

Hellula undalis, F.—Taken in the Alameda at Gibraltar, August, 1887.

Aporodes floralis, Hübn.—Among wild mint at San Roque; scarce. July, 1887.

Asopia glaucinalis, L.—Rare; Gibraltar, in October, 1887.

A. farinalis, L.—Found with the preceding; also rare. October, 1887.

Eurycreon palealis, Schiff. — Not common; among wild carrot at San Roque in May, 1887, and at Benzús Bay in June.

Botys sanguinalis, L. — Gibraltar; not rare on dry slopes on the Rock, April and May.

B. (*Mecyna*) *polygonalis*, L. — Scarce in the perfect state. The larva found commonly at the Sierra Carbonera on *Retama*, in company with that of *Spintherops spectrum*.

Nomophila noctuella, Schiff. — Generally common, especially in August.

Margarodes unionalis, Hübn. — Not rare at Gibraltar, at ivy-blossom and light in the autumn ; also at Tangier and Benzús Bay.

Metasia suppandalis, Hübn. — Taken amongst wild thyme at San Roque, June, 1888.

Stenia brugierialis, Dup. — At Campamento in September, 1887. Apparently rare.

Myelophila cribrella, Hübn.—Not uncommon among thistles, &c., at Campamento in May.

Ancylolomia tentaculella, Hübn.—In grassy places ; at San Roque and Campamento, September and October.

In addition to the preceding one or two species of *Geometræ* and several Pyrales and Crambites still remain undetermined, being in most cases represented by single examples in indifferent condition.

I have to acknowledge the kind assistance afforded me by Mr. A. G. Butler and Mr. W. Warren in working out many of the more obscure and difficult species noticed in this paper.

XI. *Notes on certain species of* Cetoniidæ *of the section* Goliathides. By Prof. John O. Westwood, M.A., F.L.S., Hon. Life Pres. Ent. Soc. London.

[Read April 2nd, 1890.]

Plate XI.

Asthenorhina Stanleyana, Westw.

Nova species *A. Turneri* major et robustior.

Mas. Supra opacus, velutinus; capite, pronoto et scutello olivaceo-luteis, elytris obscure rufo-brunneis, femoribus anticis valde robustis, viridibus, supra fulvo-holosericeis, infra cum tibiis viridibus; corpore infra olivaceo-luteo; medio sterni, pedibus 4 posticis abdomineque viridibus nitidissimis, tarsis nigris.

Fœm. Viridis nitidissima, capite antice obscure rufo, pronoti lateribus fulvo-marginatis; elytris fulvo-tinctis, vitta tenui ex humeris ad tubercula subapicalia extensa suturaque nigris.

Long. corp. maris lin. 15; fœm. lin. 13.

Habitat apud Stanley Falls, Congo. In Mus. Hopeiano, Oxoniæ.

This new species, which I have dedicated to the intrepid African traveller Stanley, is considerably larger than the type of the genus, *A. Turneri*, and, like it, the male is clothed on the upper side of the body with a close and very short velvety pile, rendering the surface opaque on the head and prothorax; this pile is of a dark fulvous colour, rather darker in front of the scutellum, whilst on the elytra it is of a dark chestnut-red; the scutellum is dark olivaceous, with slender paler lateral margins, and the suture is very slender and dark green. On each shoulder of the elytra there is a very small polished spot, and below this is a very fine elevated line extending to the subapical tubercle; each elytron is terminated at the extremity of the suture by a very small point; half-way between the longitudinal line and the suture is another scarcely perceptible fine raised line, united to the former at its junction with the subapical tubercle. The front of the head, or clypeus, is subovate,

with the sides slightly elevated, and the fore margin is rather deeply emarginate,. the edges finely black; the antennæ and eyes are black. The prothorax above is entire, without any trace of punctures, the lateral margins are dilated from behind the eyes; the posterior half of each lateral margin is suddenly angulated and rather deeply emarginate, leaving the apical angle rather acute. Beneath, the sides of the head are clothed with pale buff pile, as is also the whole of the under side of prothorax, except a small black central dot in front of the mesosternal point. The whole of the meso- and meta-sterna are clothed with pale buff pile (as are also the broad flat coxæ), except the slightly porrected sternal point, which is extended backwards to the base of the hind legs, and is of a brilliant green colour. This is also the colour of the abdomen, except the lateral part of each segment and two triangular spots on the podex, which are clothed with pale pile. The fore legs have the femora greatly incrassated, clothed in front with pale pile, but otherwise brilliant green, with two small black spines on the fore edge near the extremity, and two other very minute ones towards the base of the front margin; the tibiæ are green above, nearly black beneath, narrow, with a small black hooked spine at the apex, the inner edge clothed with fine pale hairs; the tarsi are slender and black: the four hind legs are rather small, green beneath and black above, the middle tibiæ are slightly attenuated at a little distance from the distal extremity, and in the two posterior tibiæ, in the same position, is a small oval excavation bearing a brush of fine fulvous hairs. The two spines at the apex of the tibiæ are distinct but small. The sternal point of the mesosternum is small, triangular, and scarcely produced into a lateral angle.

The maxillæ of the male are terminated by a small acute horny point densely clothed with hairs, and the mentum has the middle of its fore margin produced into two obtuse flattened lobes, rather rounded at the tips. The abdomen of the male has the two basal segments with a slight central depression.

The female of *A. Stanleyana* is entirely destitute of the fine coat of pale buff-coloured pile with which the male is adorned. It is rather smaller than the male; it is of a glossy bright green colour, the front of the head rather strongly

impressed, the margins being thin and bent upwards, the disc densely marked with small punctures and of a dark red colour; a small fine carina runs down the middle of the disc, with two fine raised lines extending from its hinder end to the angles in front of the eyes, which, as well as the antennæ, are black; the front of the clypeus is slightly emarginate. The prothorax is brilliant green, finely punctured, and slightly bi-impressed on the disc, the posterior half of its lateral edges suddenly angulated, behind which they are emarginate. The scutellum is glossy green. The elytra are green tinged with fulvous; the shoulders black, from which runs a slender carina to the black subapical tubercle; between this and the suture the disc is finely rugulose, the rugosity forming indistinct longitudinal striæ, the suture itself narrow, slightly raised and dark green; the podex is orange-red, with the apical margin green. The body beneath is glossy green, with the sides of the prosternum tinged with orange. The posterior coxæ are densely punctate. The femora are orange, with the tips black; the mesosternal process is as in the male; the anterior tibiæ are broad and strongly 3-dentate. The four posterior tibiæ and tarsi are black, the former slightly tinged with green. The four posterior tibiæ are bispinose between the base and middle, and the apex of each is dilated, especially in the hind pair. The ventral segments of the abdomen are entire, convex, and finely rugulose.

Genus Asthenorhina.

In the year 1843 I described and figured two interesting species of beetles belonging to the section *Goliathides*, forming a distinct genus, to which, in consequence of the unarmed head, I gave the name of *Asthenorhina* (Arcan. Ent., vol. ii., p. 71, pl. 67, figs. 2 and 3). It is most nearly allied to *Tmesorrhina* and *Aphelorrhina*, having the fore legs robust, with thickened femora armed near the tip on the anterior edge with two small acute spines, the clypeus entire, with the fore margin slightly emarginate, the maxillæ in the males with the apical lobe slender, and the apex curved and acute at the tip, the mentum deeply and broadly notched, the prothorax with the lateral margins strongly angulated in the middle; the body in the two specimens represented in the plate (from

the collection of the late Mr. J. Aspinell Turner, of Manchester) were both males, with the posterior tibiæ not armed with spines, but with a fascicle of hairs on the inside near the tip. The species inhabits Ashantee. It is of a dark green colour, the upper surface of the body *opaque*, and tinged with fulvous at the base of the elytra, which colour varying to luteous in one of the specimens and extending over the entire elytra, has a broad dark green stripe extending from the shoulder to the subapical tubercle; whereas the under surface of the body is glossy. The length of the insects were 10 lines.

A female of this insect was subsequently obtained by the late Captain Parry, of which I published a figure and description in the 'Transactions' of the Entomological Society of London (n. s., vol. iii., 1854, p. 63, pl vi., fig. 4). It differs from the male in having the upper surface of the body of a rich dark green colour and *shining*, the front half of the head black and the hinder part green, with the anterior and lateral margins elevated, the former emarginate in the middle, and with a central longitudinal carina slightly elevated, the epimera scarcely visible from above, the elytra finely punctured, the punctures wide apart; the shoulders and subapical tubercles black; the body beneath is dark green and polished, slightly and finely punctured, except the sides of the metasternum and coxæ, which are closely punctured; the legs are dark green, the fore tibiæ strongly 3-spined, the spines black; the four posterior tibiæ are black, slightly glossed with green, with the tarsi black.

I subsequently obtained, for the Hopeian Collection, another female with the head and pronotum very glossy and rich green-coloured, the clypeus dark orange-red, and the anterior part of the lateral margins of the pronotum orange; the elytra orange, with a small black spot on the shoulder-tubercle, and another on the subapical tubercle; the scutellum and narrow suture dark green; the legs black, slightly glossed with green.

In 1880 Dr. Kraatz published the description and figure of a female insect from Ashantee (which I cannot distinguish from that of *Asthenorhina Turneri*), to which he has assigned the name of *Platynocnemis marginicollis* ('Deutsche Entom. Zeitschr.,' 24 ann. 1880, p. 148, pl. i., fig. 1), with the observation:—"Da mir von *Asthenorrhina* nur ♂ vorliegen, von *Platynocnemis* nur

ein weilchen, so bedürfen die Angaben über die Bildung der beine bei den verschedenen Geschlechtern noch späterer ergänzungen; die Bedornung der schienen ist bei *Asthenorrhina* ahnlich wie bei *Platynocnemis* ♀ aber von der erweiterung der hinterschienen ist in Westwood's Abbildung nichts zu sehen."*

Goliathus Fornassinii? and *G. Higginsii.*

I recently (November last) received from Mr. A. T. Glama, of St. Petersburg, a sketch of a male of a species of Goliath beetle (which is copied in Plate XI., fig. 4) from Accra, W. Africa, which appears to be allied, so far as the head is concerned, to *Goliathus* (*Goliathinus*) *Fornassinii* of Bertolinii, the male of which, from Zambesi, is represented in my 'Thesaurus Entomologicus,' pl. 1, fig. 1, from the late Mr. Turner's collection, and the female by M. Thomson, in the 'Annals' of the French Entomol. Society, 1856, pl. vii., fig. 1, and which agrees with Mr. Glama's insect in having the anterior tibiæ bidentate. The latter insect has the head and prothorax very black, the latter without the longitudinal yellow lines, the elytra brown (brun foncé) with yellow spots, and the legs (jambes tres noir), the head and eyes pitchy black; the thorax with deep punctures; the prothorax very broad, subheptagonal, with an angulated depression in the middle.

The insect seems also to approach, in the subheptagonal form of the prothorax, the female insect of which I figured in 'Thesaurus Entomol.,' pl. 2, fig. 7, under the name of *Goliathus Higginsii*, from Tropical Africa. As illustrating these rare insects I have added a copy of my figure of this insect to the present plate. The male being unknown, I cannot refer it satisfactorily to its generic position.

* In both the figures of *Asthenorrhina Turneri* ♂, above referred to, the slight emargination or impression near the apex of the two posterior tibiæ is clearly shown.

Explanation of Plate XI.

Fig. 1. *Asthenorhina Stanleyana*, male; 1 *a*, maxilla of male; 1 *b*, mentum of ditto.

2. Ditto, female.

3. *Goliathus Higginsii;* 3 *a*, maxilla; 3 *b*, mentum.

4. *Goliathus Fornassinii*, copied from Mr. Glama's sketch.

XII. *On the structure of the terminal segment in some male Hemiptera.* By David Sharp, M.B., F.R.S., F.L.S., &c.

[Read February 5th, 1890.]

Plates XII., XIII., & XIV.

The arrangement of the subjects is as follows:—

1. *Introductory.*
2. *Description of the parts in various species.*
3. *Comparative observations on the separate structures.*
4. *General remarks.*

I. *Introductory.*

Although entomologists are now becoming acquainted with the remarkable and complicated structures connected with the organs of the male devoted to the fertilisation of the eggs of the female, it is probable that the subject has even yet not received so much attention as it deserves, and as it will doubtless secure in the future. There are several reasons for this comparative neglect; among them may be mentioned the extremely complex and varied nature of the structures: this not only renders them most difficult to describe intelligibly, but also has hitherto made it impossible to homologise the various parts seen in different insects, so that no satisfactory system of nomenclature for them has been established. To this may be added the great difficulty that exists in forming any idea of their true function.

I have recently been examining some heteropterous bugs, and I have found these structures in them remarkably easy of examination, and to a certain extent, perhaps, comprehensible as regards their function; and as very little, so far as I have been able to find, has been written about them, I have thought the following remarks about a few *Pentatomidæ* might possibly be of some value, notwithstanding their very imperfect and desultory nature.

In order to make my descriptions intelligible, I must briefly sketch the general conditions prevailing in the *Pentatomidæ*, as to the structure of the terminal (or genital) segment in the male sex.

First, it forms a cavity or chamber widely open externally, which I shall call the terminal chamber, and in this open chamber are placed the following structures, *viz.*:—1. The part of the male organs through which pass the membranous structures connected with the ejaculatory duct; this I shall call the œdeagus. 2. The termination of the alimentary canal; this is free and very mobile, and forms a sort of tail: I shall therefore call it the rectal-cauda. 3. Some accessory pieces or appendages, viz., *a*, *lateral*, one on each side; *b*, *inferior*, a single piece. The general arrangement of these parts is that the rectal-cauda is in the middle above, and completely overlaps and covers the œdeagus, which is usually so completely concealed that I had examined many specimens without suspecting its existence until I discovered it by dissection; the lateral appendages are placed near the side-walls of the segment, one on each side, and are in many species very mobile, though in other cases very little power of movement appears to be present: the inferior accessory piece is placed on the middle of the inferior part of the segment directly below the termination of the rectal-cauda.

These parts exist in all the *Pentatomidæ* I have examined, and though so variable in form from species to species that they are not similar in any two I have seen, yet they are in all clearly homologous. There is another part, of a very peculiar and important nature, that is nearly always (perhaps I might say absolutely always) present, *viz.*, a tubular or cylindrical structure, fastened to the inner face of the floor of the chamber, and completely surrounding the œdeagus; it is, in fact, a fence or hedge, open only above; I will speak of it as the theca.

In order to complete this brief outline of the nomenclature I have used, I should add that the transverse deflexed wall separating the anterior part of the segment from the open posterior part is called the diaphragm, and that there frequently exists on each side of this diaphragm and close to the rectal-cauda a projection of variable form, which I have called the superior lateral process.

The posterior edge of the segment, which is very variable in form, is called the lip.

In reference to the Plates XII., XIII., XIV., which illustrate the following descriptions, I must say a few words of explanation. Such figures are very difficult to draw, owing to its being far from easy to see with definiteness into the depths of the chamber in which the pieces are placed; thus anyone who has not dissected specimens fails to catch the relations of the pieces, especially at their bases and in the depths of the chamber, and this has happened in the case of several of the figures here given. The structures, too, are much more delicate than the plates give an impression of, so that, owing to this and to the absence of colour in them, they do not convey at all adequately the idea of elegance and ornamentation which I think would be perceived by all who inspect the parts in their natural—especially if fresh—condition.

II. *Descriptions of the male characters in some species of Pentatomidæ.*

Owing to the kindness of my friend Mr. W. L. Distant, who has determined the species for me, and given me such other information as I sought from him, the names here used are no doubt correct; a most important point in such descriptions.

1. *Tesseratoma nigripes*, Dall.* (subfam. *Tesseratominæ*). Hab. N. India. Fig. 2, Pl. XII.—The rectal-cauda is quite short and very broad, and its hind margin ciliate; behind it, but a little beyond it, there projects upwards the inferior process, which is of very hard consistence, subacuminate at the extremity, and concave in front; there is a space between it at the apex of the rectal-cauda, and there does not appear to be any special provision for defending the orifice of this latter part. The lateral appendages are very large and of complex form, the inner margin of each is accurately adapted to the side of the rectal-cauda, and, passing close to the inferior process, is furnished at the apex with a small abruptly bent-in process, which, when the inferior appen-

* This species has the peculiarity of having the lower wings beautifully coloured.

dage is depressed, is pressed upon by it, so that co-ordinated action between the inferior and the lateral appendages perhaps exists.

In this species the open face of the terminal chamber is very large, but is directed entirely upwards, and can be completely closed by the mere apposition of the inferior face of the hemi-elytra; at the hind margin of the chamber there is a large triangular incrassation projecting anteriorly, and the apex of this process serves as a support to the extremity of the inferior accessory appendage when this is depressed.

2. *Tesseratoma papillosa*, Drury. Hab. China. Fig. 3, Pl. XII. — The position, arrangement, and relations of the pieces is similar to that described in the preceding species, but the shape of the chamber behind, and the texture, sculpture, and clothing of the various parts is quite different. These latter points are probably correlative with the striking difference in the colour and texture of the dorsal segments of the hind body in these two species.

3. *Tesseratoma malaya*, Stal. Hab. Hills of N. India. Fig. 1, Pl. XII.—Similar to *T. nigripes*, but with well-marked distinctions in the form of the lateral appendages.

4. *Eusthenes curytus*, Distant (subfam. *Tesseratominæ*). Hab. N. India.—The rectal-cauda is here very short, not very broad, and only partially covers the œdeagus; only the bifid process terminating the latter can, however, be perceived, owing to the great development of the theca: this theca is of a most remarkable nature in this insect, being white and deeply striate, so that when the insect is in the natural condition of dampness it has the appearance of an assemblage of minute rods. Whether this be a post-mortem condition due to shrivelling I do not know. The rectal-cauda, in the only specimen at my disposal, is surrounded at the base by a folded and corrugate membrane, and I expect this permits the cauda to be slightly extended downwards so as to cover the theca. The inferior process is subacuminate at the extremity and concave in front, similar, in fact, to that of *Tesseratoma*, but smaller; the lateral appendages are very different in form from those of

Tesseratoma, especially as regards the internal terminal process, and I do not know whether this can be brought into such a position as to be pressed upon by the inferior process. There is no incrassation of the lip of the chamber in the middle behind.

The colour of the dorsal plates of the hind body in this insect is in life magnificent, being of a brilliant metallic colour, in tint between violet and purple. This fades after death, but may be restored by thoroughly wetting the insect.

The diaphragm projects strongly on each side of the cauda in an angular manner, forming thus a superior lateral process of a much less perfectly differentiated character than it assumes in many other species where it is present.

5. *Eusthenes pratti*, Dist. Hab. Central China. Fig. 4, Pl. XII.—The cauda is short, not deflexed, but projecting backwards, fuscous in colour, with white membranous extremity, the orifice open and exposed; the diaphragm surrounding the base of the cauda is white, membranous. The theca is a nearly transparent, white, longitudinally striated structure: from its middle projects the extremity of the œdeagus. This organ also is quite white, and appears seminembranous, but is really of chitinous consistency; its exposed part is of irregular form, but possesses a large cleft along the middle, and from this there projects a perfectly transparent, very elongate, thread-like structure (the true intromittent organ, I presume): within the theca, on each side, there is a slender free wing, something like a small compressed rod; this is rather darker in colour than the other parts of the œdeagus.

The lateral appendages are placed rather deep down, and are therefore not very conspicuous, but are of complex form; the terminal part of each forms two lobes, one of which is slender and polished, and reflexed upwards just before the orifice of the cauda, its extremity just touching that of its fellow of the opposite side; the other lobe is much broader, placed more externally, and bears much long pubescence. The inferior process is placed just below the inner pair of the lobes of the lateral appendage, and is shaped like the terminal portion of the bowl of a spoon.

There is in this species an additional or superior lateral process on each side, in the shape of a projection inwards from the outer wall of the segment; it is a polished subacuminate process of black colour, placed at the side of the cauda just at the termination of the diaphragm.

In the figure of this species (Fig. 4, Pl. XII.) the shape of the segment is not well rendered, and the inferior process is not correct in shape.

6. *Eurostus grossipes*, Walk. (subfam. *Tesseratominæ*). Hab. N. India.—Of this remarkable species I have only a mutilated individual of the male sex at my disposal. The characters are in most respects similar to those of the other *Tesseratominæ* I have described, more especially to *Eusthenes curytus*, but with differences in all the details, and with the important distinction that the inferior accessory process does not project upwards behind the processes of the lateral appendages, but remains below them: the rectal-cauda is moderately long, with its outer face deplanate, and it conceals the œdeagus, which is surrounded by a striated theca of pallid colour, but apparently of much less perfect structure than that of *Eusthenes curytus;* the lateral appendages are large, and each is terminated by a free slender process extending upwards and backwards, and a little curved.

7. *Aspongopus obscurus* (subfam. *Dinidorinæ*). Hab. Assam.—The arrangements of the parts are similar to those of *Tesseratoma*, the lateral appendages being, however, very different in form; they are curved round behind the inferior process, and meet together in the middle at some little distance behind this inferior process, with which they are perfectly co-ordinated when the latter is depressed, and they are, too, furnished with a few elongate setæ at the points where the parts come into contact. A second species of the genus from the same locality differs chiefly in that the lateral appendages are still larger, and are in close contact with the inferior process.

8. *Piezosternum subulatum*, Fab. (subfam. *Dinidorinæ*). Hab. Bogota. Fig. 10, Pl. XIII.—The structures in this insect are so very different from those of *Aspongopus*

that the propriety of placing the two insects in the same subfamily may be doubted; the segment is, in fact, quite different in its plan from any other Pentatomid I have seen, and seems to approach in some respects the family *Pyrrhocoridæ*. When the hemi-elytra are opened and the insect first inspected it seems as if all the parts were absent; the floor of the terminal chamber projects backwards, and its sides are curved upwards so that an imperfect cavity is formed, and all that can be seen is a transverse projection on the upper part of the anterior wall of this very open cavity. This is, however, due to the very great retractility of the terminal segment, and when the segment is extended to its full length, it is seen that the anterior part, which was covered during retraction by the preceding segment of the body, is the true terminal chamber, and the part behind it that was exposed is merely an adventitious growth. The orifice of the true terminal chamber looks directly upwards, but does not occupy anything like the whole of the upper aspect of the chamber, but is confined to an oval space on its centre; the orifice, too, is in larger part filled up by the rectal-cauda, which is not at all deflexed, but forms a horizontal roof in the position I have mentioned: immediately behind it there are two small projections nearly meeting in the middle; these are the lateral appendages; the projection I have alluded to previously as seen on the upper part of the anterior wall of the adventitious posterior cavity, it is now seen occupies the position of the inferior process. Although it has the form and somewhat the position of that part, as described in the *Tesseratominæ*, it differs in the important fact that it is not articulated, and also, of course, in the fact that it is placed altogether behind the lateral accessory processes, instead of in front of their terminations.

In considering the functions of the different parts hereafter, I shall state that I consider the function of the inferior lateral process to be that it determines the exact direction to be taken by the œdeagus when it is protruded, or rather deflexed. It is possible that the projection I am now speaking of in *P. subulatum* may have this function, though I very much doubt it.

On lifting up the rectal-cauda (and this is very easily done when the specimen is duly relaxed) the very large theca is seen occupying the greater part of the chamber,

and exposed in its upper part are the terminal pair of processes of the œdeagus.

9. *Megarhynchus limatus*, H.-S. (subfam. *Pentatominæ*). Hab. Assam. Fig. 18, Pl. XIII. — Passing to the subfamily *Pentatominæ*, we find the structures not only very different in appearance from those already considered, but evidently distinct in some of their functions. First, the position of the open face of the terminal chamber is different; instead of looking upwards it is directed backwards, and it is more completely withdrawn into the preceding segment; but when so retracted the structures by which the segment is closed are quite conspicuous without dissection, or even without the segment being extended or drawn out of its receptacle in the preceding segment.

In the extremely delicate and elegant *M. limatus*, the most conspicuous point in these parts is the rectal-cauda; this is delicately tinted, and extends downwards longitudinally along the segment, which it in great part closes; it is pointed at the extremity. On each side of it are seen the, also very conspicuous, lateral appendages; these are comparatively slender and free, and are somewhat like curvate compressed horns. The inferior process is a slightly raised, transverse ridge along the floor of the segment, and is emarginate in the middle so that the terminal point of the rectal-cauda fits accurately into it, and thus completely closes the orifice of the terminal chamber. Having only one specimen of this insect in my possession, I am unable to speak of the condition of the œdeagus and the theca; but the species is an interesting form, as the structures are much less highly evoluted than they are in the next forms of *Pentatominæ* I shall describe. Our European *Acanthosoma tristriatus* is somewhat allied in the structure of these parts to *Megarhynchus*, but is still more imperfect. Fig. 19, Pl. XIII.

10. *Nezara* sp., near *acuta*, Dall. (subfam. *Pentatominæ*). Hab. Madagascar. Figs. 11 *a*, 11 *b*, 12, Pl. XIII. —This species, for which I am unable to find a specific name, was obtained by the Rev. Deans Cowan at Marosika, twenty miles north of Mahanoro, east coast of Madagascar, and is probably undescribed. The terminal

segment in the male is very retractile, and in the condition of repose is drawn so completely into the body that when the insect is looked at from above or below the segment appears to be entirely absent, but looked at from behind all the parts of the structure are displayed, and present a very remarkable appearance; the segment may be easily withdrawn by extension from the protection of the body, and it is then seen that the remarkable processes of the terminal chamber are really greatly exposed. In the middle there is seen a structure presenting a concavity somewhat like an oyster- or scallop-shell in shape, with raised margins: this is a portion of the rectal-cauda; on each side posteriorly the angles of the segment are flexed upwards and dilated, and are remarkably irregular in form; above them the superior angles of the chamber project backwards, and form on each side a process somewhat similar to the posterior angles; there is no inferior process behind the rectal-cauda; the lateral appendages are concealed in the large irregularly-shaped fissure existing between the superior and inferior angles, as above described, and the tip of the appendage just comes into contact with the peculiarly raised black margin of the reflexed inferior angle: on the middle of the dorsal part of the segment there is seen projecting backwards a process which, seen from above, looks very like the rectal-cauda of the *Tesseratominæ*, and which, occupying as it does exactly the same position, would naturally be supposed to be the homologue of that part: but this is not so; this projection is a portion of the anterior chamber projecting backwards, and in all probability is homologous with the corrugated membrane I have described as existing at the base of the rectal-cauda in *Eusthenes eurytus*.

The rectal-cauda examined in detail is of remarkable structure; its basal part is placed under the process just mentioned, and is quite delicate and membranous, but immediately beyond this its outer aspect is developed into the peculiar shell-like structure I have already mentioned; beyond this shell-like piece there is a narrow chitinous strip, deflexed so as to be placed almost at right angles to the preceding part of the cauda, and the orifice of this cauda is directed quite downwards, and is surrounded by a protruding pale membrane.

The membranous basal portion of the rectal-cauda

acts as a sort of hinge, and allows the part to be lifted, and when this is done the œdeagus and its theca are seen placed just beneath the membranous basal part of the cauda; the theca is a large tubular or conico-tubular structure open at top only, and there displaying the extremity of the œdeagus, which consists of an extremely delicate minute tube and of a pair of plate-like lobes projecting just beyond the theca.

The reflexed and elevated posterior angles of the chamber in this species are, I think, clearly homologous with the transverse line, which I have described in *Megarhynchus limatus* as being the inferior process, and it should be noticed that different entirely as this part is from the inferior accessory appendage of the *Tesseratominæ*, yet the two have this in common, *viz.*, that the tips of the lateral appendages are co-ordinated with the inferior appendage, so that the two have clearly a relation in their movements.

11. *Nezara viridula*, L. Hab. Madagascar. Fig. 16, Pl. XIII.—This insect, though possessing a great superficial resemblance to *Nezara* sp.?, described above, differs so strongly from it in the male characters that I doubt whether the two can be correctly placed in the same genus. The characters, as will be seen on a comparison of the figures, are similar to those of the genus *Edessa*.

12. *Nezara marginata*, De Beauvois. Hab. Volcan de Chiriqui, Panama. Fig. 17, Pl. XIII.—The characters are very similar to those of *Nezara* sp.?, from Madagascar, the distinctions being in size and form of the various parts.

13. *Dalpada oculata* (subfam. *Pentatominæ*). Hab. Assam.—The external characters, so far as I can see them in the only individual I possess, are not very remarkable; the rectal-cauda is very large, elongate, and greatly deflexed, and possesses along the middle a fine line having the appearance of a suture; the lateral appendages are very large, and are shining and polished, in strong contrast to the contiguous parts: there is apparently a small inferior process in the form of a

raised carina placed quite underneath the apex of the rectal-cauda. The œdeagus I am unable to see.

The most remarkable peculiarity in this insect is that the floor of the terminal chamber is divided at the bottom very far forwards, so that by a very slight projection of the rectal-cauda excrementitious matter is ejected outside the organism.

14. *Cappæa taprobanensis* (subfam. *Pentatominæ*). Hab. Assam.—In this curiously coloured species the terminal segment is of smaller size than usual, and the lateral appendages are so deeply placed that I am not able to describe their form, to do which a special dissection would be necessary. The floor of the terminal chamber is deeply divided in the middle as far as the extremity of the rectal-cauda. This is narrower towards the apex, without sculpture, and overlaps the inferior process, which is therefore concealed by it. Though the species resembles *Dalpada oculata* in having the floor of the terminal chamber divided deeply, to allow the deposition of the excrement outside the segment, yet in the lateral appendages the two appear to be entirely different.

15. *Stilida indecora*, Stål (subfam. ?). Hab. Queensland. Figs. 5, 5*a*, 5*b*, Pl. XII. — The rectal-cauda is quite short, not deflexed, and the posterior part of its upper surface has a triangular area that is roughly punctured and pubescent. The œdeagus is quite concealed, but, on cutting off the rectal-cauda, it is seen to be very large, completely filling up the theca in which it is placed, and having the appearance of being a densely-packed bundle of corrugated membrane which has a groove in its posterior aspect, and in this there is placed a free, slender, slightly curved, chitinous ligula. The theca is smooth and polished. The lateral appendages are small, are placed very close to the rectal-cauda, and project backwards behind it as two slender, elongate, curved processes, whose apices just meet in the mesial line. The inferior process is almost entirely concealed by the rectal-cauda, but when this latter part is removed the inferior process is seen to be a rather slender, elongate ligula, placed immediately behind the theca, projecting backwards and upwards, quite smooth and polished, except a smooth portion at the tip, which is depressed and roughly sculptured.

16. *Edessa rufo-marginata*, DeGeer (subfam. *Pentatominæ*). Hab. Central America. Figs. 6, 7, Pl. XII., 8, 9, Pl. XIII.—The rectal-cauda is very large, and is curved from above downwards, so that its orifice is not at all displayed, being, in fact, closely adpressed to the floor of the terminal chamber. The basal part of the cauda is quite cylindrical, smooth, and shining, but the median part of the cauda is thickened, and forms an angular chitinous process on each side ; the two processes, viewed from behind, form together a flattened prominence, each outer edge of which is curved, and is densely fringed with ciliæ directed outwards; the lower part of the cauda below the prominence is transversely striate.

The œdeagus is completely concealed by the cauda, but when this is removed the œdeagus is seen as a hard symmetrically formed polished black object, only the apex of which projects from the theca by which it is closely embraced, the theca forming, in fact, in the case of this species, a part of the œdeagus ; the œdeagus has its free apex deeply and broadly grooved, and at the bottom of the groove in the middle there is a minute round orifice. The lateral appendages are large, and have a very irregularly formed terminal portion. There is no inferior appendage ; but in this species there exists on each side a superior lateral process, projecting from the anterior wall of the terminal chamber : each process is bifid, and the edge of the posterior arm of the lateral appendage moves inward against the cleft.

17. *Edessa cornuta*, Burm. Hab. Guatemala, San Geronimo. Fig. 15, Pl. XIII.—The general disposition of the parts is similar to what has been described in *E. rufo-marginata*, but the shape of the lateral appendages is very different, and the ornamentation of the lower part of the rectal-cauda is very inferior.

18. *Edessa* sp. Hab. S. America, Corrientes. Fig. 14, Pl. XIII.—Although a very obscure insect, the development of the rectal-cauda is remarkable, and I have therefore figured it.

19. *Pharypia pulchella*, Drury. Hab. Pantaleon, Guatemala. Fig. 13, Pl. XIII. — The segment in this species is entirely black, and as the sides are a good deal produced beyond the pieces seated in the chamber, these

are difficult to see, and are not quite correctly rendered in the figure. The cauda has an angular incrassation on each side (though not so represented in fig. 13), and the apices of the lateral appendages project, one on each side, as an obtuse rounded lobe ; in the middle of the lip there is a small angular excision.

20. *Catacanthus incarnatus*, Drury (subfam. *Pentatominæ*). Hab. E. India. Fig. 20, Pl. XIII. — Of this very beautiful bug I have only one male example at my disposal, and the arrangement of the parts of the genital segment is so complex and peculiar that these cannot be explained satisfactorily without breaking up a specimen. The lip of the segment is very deeply divided ; the cauda appears to be short, and to bear a ciliate ovate ornament ; the lateral appendages are very elongate, tusk-like processes, and there is a large superior lateral process on each side. In addition to this there are some peculiar complicated objects projecting from within, or from beneath the cauda, and these I cannot at present reconcile with anything I have seen in other species.

21. *Cantao ocellata* (subfam. *Scutellerinæ*). Hab. Himalaya.—The terminal segment is completely covered by the scutellum, and the tips of the wings project backwards beyond it. On extracting the segment it is seen that the rectal-cauda is moderately long, and is partly coloured black and yellow, and is hairy ; it is closed at the extremity by a valvular membrane, at the base it is somewhat constricted, and is embraced on each side by the diaphragm, which is horizontal in its direction and emarginate for the reception of the base of the cauda, and emits forwards on each side a small, curved, corneous process closely applied to the cauda. On lifting the cauda the large theca is seen ; it is transversely striate : the œdeagus cannot be seen. The inferior process forms a large inverted arch, which can be seen on the floor of the chamber below the cauda. The lateral appendage is seen on each side of the cauda as a small polished rounded process, whose extremity scarcely extends backwards at all beyond the diaphragm, which, as already stated, forms here a horizontal roof.

22. *Chrysocoris ornatus*, Dall. (subfam. *Scutellerinæ*). Hab. N. Indian Hills. Fig. 24, Pl. XIV.—This is a very highly modified form, so far as the external parts of the male segment are concerned. The diaphragm is very abruptly folded in, is corneous, but is pallid in colour, and is marked by numerous series of black file-like (or comb-like) asperities, arranged so as to form a pattern; there are altogether about fifty rows (of very different lengths) of these curious processes.*

The rectal-cauda is large, and extends nearly to the floor of the segment; it is in greater part corneous, but has a large sharply defined membranous patch at the extremity. The theca and œdeagus I cannot see. The lateral appendages are of peculiar form, and are seen, one on each side, as abruptly bent hooks, projecting towards the cauda; each hook bears on its basal part a patch of pubescence. The inferior process is a sharply defined carina, depressed in the middle, extending all across the floor of the segment, below the orifice of the cauda.

23. *Calliphara obscura*, Hope (subfam. *Scutellerinæ*). Hab. N. Borneo ?. Fig. 25, Pl. XIV.—The floor of the terminal chamber is much produced posteriorly, and at the truncate apical angle on each side there is a large patch of peculiar scales similar to those mentioned in *C. ornatus*, though so different in their position. The rectal-cauda is large, laterally subcompressed, and subcarinate along the middle. The lateral appendage is a large horn-like process, much curved outwards, with dilated base. The inferior process can scarcely be distinguished.

24. *Pœcilochroma lata* (subfam. *Scutellerinæ*). Hab. Assam. Figs. 21, 22, 22*a*, 22*b*, Pl. XIV.—In this species the rectal-cauda is less deveolped than it is in any other *Pentatominæ* I have examined, and appears merely as a small rounded process of a reddish colour pendent from the upper part of the terminal segment. There is apparently no theca, and owing to this fact, and to the small size of the cauda, the œdeagus is exposed; as seen

* Comb-like processes similar to these are found on the accessory male organs of some *Staphylinidæ*, where the male characters are very extremely developed, as in *Plociopterus*, for example.

without dissection its large upper face is noticed to be bifid. On taking out the œdeagus it is found to be a very remarkable organ ; it is divided by a transverse joint into two parts : of these the lower is probably the theca ; it is nearly cylindrical, polished, and bears some longitudinally raised lines ; from the joint between it and the apical part of the œdeagus there spring, on the posterior aspect, two curious elongate tentacular processes of pallid colour ; the apical half is of more complex structure, and is divided into two parts by a longitudinal cleft : on the posterior aspect, at the base of this cleft, there is an oval process just between the two tentacles I have already described ; on the front aspect there is a prominent pointed process projecting, and on each side of this a pallid tentacle considerably shorter than those on the posterior aspect ; the terminal face of the œdeagus presents the appearance of a broad truncate process of pallid colour, cleft along the middle, and bearing on each side of the cleft a large black oval prominence, the extremity of each prominence being free and pendent over the front of the œdeagus.

The lateral appendages in *Pœcilochroma lata* are not very conspicuous, but consist of a polished spinose hook, placed one on each side, the apex of each hook being a little broader, so as to form a chisel-like edge. A second smaller hook, the superior lateral process, crosses the larger hook near its base, as if to afford it support.

The inferior process is absent on the mesial line, but on each side there is a raised carina extending far upwards, and it is from the upper part of this carina that proceeds the second hook I have mentioned above under the name of the superior lateral process.

25. *Pœcilochroma hardwicki*, Hope (subfam. *Scutellerinæ*). Hab. Himalaya. Fig. 23, Pl. XIV. — On extracting the terminal segment of the male, it is found to be broad, and the rectal-cauda is short, of a pallid tawny colour, hairy, and bears on each side of its upper face a curvate pointed spine or horn : the diaphragm is membranous and pallid in colour. On lifting the cauda the very large theca is displayed ; it is smooth and polished : the œdeagus cannot be seen. The inferior process is seen below the cauda as a ridge or carina forming a curve with the concavity upwards. The lateral appendage is

seen on each side as a small, polished, curved process, projecting inwards from the lateral wall of the chamber, which is itself here prominent and projecting inwards.

26. *Calidea baro* (subfam. *Scutellerinæ*). Hab. Himalaya.—The terminal segment in the male, when extracted, appears to be entirely closed behind by a polished curtain, extending from the roof to the floor, and marked down the middle by a longitudinal groove; this curtain is the posterior face of the rectal-cauda, which is peculiar; the anterior face of the cauda is quite membranous, pallid in colour, and totally different from the external face; the tip of the cauda is closed by a membrane. On taking off the cauda it is found that the parts covered by it are difficult to distinguish well, being seated far forwards, and much enclosed; the theca is placed at the bottom of the segment, and from it projects forwards and upwards; this consists (so far as I can see in one example and without dissection) of five elongate rods, connected by a material of less hard texture, and of more pallid colour. The lateral appendages form two shell-like laminæ, placed just behind the theca, and very deeply seated. The inferior process is a carina forming an inverted arch, whose arms are directed much forwards as well as upwards. There is a very prominent hooked process fixed to each side of the inner wall of the chamber, near its upper part.

27. *Brachyplatys* sp.? (subfam. *Plataspinæ*). Hab. Old Calabar. Fig. 26, Pl. XIV.—The lip of the terminal chamber projects beyond the body so as to form a floor (the shaded part in figure, which is really horizontal in direction, though in the figure it looks perpendicular); there are no sides to the chamber, and the rectal-cauda has a small process closely applied to the extremity of the body and exposed posteriorly, though somewhat protected above by the slightly overhanging termination of the scutellum. The lateral appendages form two slender filaments. In the figure they are represented too large and not sufficiently close to the roof, or hind margin, of the scutellum.

28. *Brachyplatys* sp.? (subfam. *Plataspinæ*). Hab. Marosika, Madagascar (*Cowan*). Fig. 27, Pl. XIV.—The terminal chamber has here disappeared, and the rectal-

cauda is a small papillary process, exposed at the lower part of the perpendicular shell-like process that forms the extremity of the abdomen. The lateral appendages are two very slender, small, curved spines, closely applied to the cauda, and not distinguishable without examination.

29. *Taricha nitens*, Dallas (subfam. *Plataspinæ*). Hab. Burmah. Fig. 28, Pl. XIV.—The terminal chamber is here also absent, and the small rectal-cauda is exposed at the apex of the body, but is somewhat protected by this being a little concave and somewhat overarched by the extremity of the scutellum. The lateral appendages are small curved spines, and the inferior process apparently exists as a small piece placed below, and closely applied to the rectal-cauda.

III. *Comparative remarks on the various pieces.*

The posterior or terminal chamber.—The terminal segment of the male in the *Pentatomidæ* consists of two parts—1, the terminal chamber, which is open above, or both above and behind; and 2, the anterior chamber, which is covered in, and contains, in addition to other structures, some powerful muscles. The general form of the segment is that of a cylindrical or conical body, of which a portion has been sliced off. The separation between the two chambers is effected in larger part by a diaphragm, which descends from the upper part more or less obliquely; this diaphragm thus forms the anterior wall of the posterior or terminal chamber.

In a large number of species the terminal chamber has its opening upwards; in *Nezara* and a number of others its open aspect is directly backwards; in *Piezosternum* the growth forming this chamber has become so extensive that it forms a completely closed receptacle, with an opening only in the middle of the roof, while behind it there is formed a portion of yet another chamber, a remarkable phenomenon which I have not found in any other Pentatomid. On the other hand, in the *Plataspinæ*, the posterior chamber is absent, but there exist on the end of the body the foundations, as it were, marking out its plan; and in the species of *Brachyplatys*, figured Pl. XIV., fig. 26, a portion of the floor of the chamber is present, and in another member of the

group, not otherwise mentioned in this paper, the structure and position of the terminal chamber is quite different from anything I have described; so that evidently in this group very extraordinary modifications are to be found.

The anterior chamber I shall not further allude to, as the parts with which I am now concerned are situated in the posterior chamber. Passing to this part: it will be seen that its posterior margin is to a greater or less extent unoccupied; this part may be conveniently called the lip, this term including the space between the inferior process and the hind margin of the segment. The lip varies extremely in its form; it may be prolonged in the middle, the prolongation differing in size and shape according to the species, or it may, on the contrary, be deeply divided along the middle, being thus more or less completely cleft into two halves. *Cantao ocellata* is an example of a species with the lip prolonged in the middle, while *Dalpada oculata* is one in which it is deeply divided.

In the species of *Tesseratoma* the lip bears in the middle a large raised process extending forwards towards the inferior process. I have not observed a similar process in any other genus.

The diaphragm.—This is the part that limits the posterior chamber in front, where it appears as a deflection of the upper surface on each side of and around the cauda; it differs greatly in its direction, in some descending perpendicularly, in others remaining nearly horizontal: it also differs greatly in texture, colour, and sculpture, and in the clothing it bears. It appears in its most remarkable condition in *Chrysocoris ornatus*, where it is very abruptly inflexed, pallid in colour, and large in extent, and ornamented with patches of black scales or asperities.

The rectal-cauda.—The rectal-cauda, or the cauda, as it may for the sake of brevity be better called, is the most remarkable of the external male characters in the *Pentatomidæ*. It differs, however, greatly in the different species and genera. It is comparatively insignificant in *Pœcilochroma lata*, but becomes a truly extraordinary process in *Edessa*, in *Nezara*, and in *Catacanthus*. In the larger *Tesseratominæ*,—genera *Tesseratoma*, *Eusthenes*, and *Eurostus*,—it is horizontal in its direction, and

merely projects as a short horizontal process, terminating in the middle of the posterior chamber. In *Edessa* it extends the whole length of the segment along its middle, the orifice of the cauda being closed by apposition with the floor of the chamber at the part I have called the lip. In this genus, as well as in *Nezara* and *Catacanthus*, the cauda is ornamented by thickened processes or bosses, which are frequently covered with symmetrically curved ciliæ.

Excepting only in *Pœcilochroma lata*, the cauda covers up the œdeagus, and for this purpose its under face is very peculiarly formed, being hollowed by a large cavity, the lips of which differ much in form and other respects in different species. In those genera where the cauda is elongate, *Nezara* and *Edessa*, e. g., it so completely encloses the œdeagus that that organ can only be brought into use when the cauda is got out of the way; for this purpose it is capable of elevation, and of being retracted to a considerable extent into the anterior chamber. The species of *Edessa* I have examined, notably *E. rufo-marginata*, afford a good illustration of this peculiarity.

In the *Plataspinæ* the cauda forms a curious rounded, very slightly elevated, process, having no apparent orifice, owing to this being curved forwards and applied to the face of the segment, and protected beneath by a small carina.

Although I do not entertain any doubt as to the cauda being really the terminal portion of the alimentary canal, it is, perhaps, well to say that I have not verified this by tracing it forwards into the abdominal cavity.

The lateral appendages.—Although constantly present in the *Pentatomidæ*, these appendages are not alike in form in any two species, and they, in fact, differ so extremely in their shapes that it is almost impossible to say anything of a general character as to this point. Their position is, however, constant, one on each side of the rectal-cauda, and frequently curving round behind its extremity. The anterior parts of the lateral appendages penetrate through or under the diaphragm, where their extremities are connected together by means of a strong ligament, which passes immediately behind, and presses on, the theca of the œdeagus. The lateral appendages are of very large size in the species of *Tesseratoma* and

in *Aspongopus obscurus*. In the *Plataspinæ* they appear at first sight to be absent, but I have succeeded in detecting them in nearly all the species I have examined in the shape of curvate, slender, more or less minute, spines, placed one on each side of the protuberant boss formed by the curiously metamorphosed cauda.

The inferior process. — The usual form for the inferior process to take is that of a ridge or carina, extending transversely across the floor of the posterior chamber behind the œdeagus, and immediately below the terminal orifice of the cauda: this ridge may be depressed in the middle, or even quite divided into two separate parts by a deficiency in the middle, or by the division of the lip of the chamber into two lobes. On the other hand, the inferior process in certain species takes the form of a raised acuminate ligula, shaped much like the terminal portion of the bowl of a spoon; this is well seen in the *Tesseratominæ*.

The theca.—The theca is always present, so far as I have observed, except in *Pœcilochroma lata*, where it is apparently wanting. Like the other male parts here described, it varies greatly in different species in size, texture, and other points. It forms a fence surrounding the œdeagus, and open at the top to permit the passage of the true intromittent organ through the œdeagus. But in *Edessa rufo-marginata* the theca closely embraces, and in fact forms part of, the œdeagus; and in *Pœcilochroma lata*, alluded to above, I have little doubt that the lower part of the œdeagus, as shown in fig. 22*a*, is really the theca, in which case this insect differs from other forms here described in that the theca is placed below the œdeagus instead of around it.

The function of the theca is no doubt like that of the rectal-cauda, to serve as a protection to the œdeagus, which it completely surrounds, except at the extremity. There is some evidence that the special duty of the theca may be to protect the œdeagus from the weight and pressure of the rectal-cauda. This evidence is as follows: —So far as I have yet observed there is only one Pentatomid—*Pœcilochroma lata*—in which the œdeagus is not covered by the cauda, but stands up free and exposed behind the very short cauda. Now, this species is also the only one I have discovered in which the theca is apparently absent; but it would appear that if the theca

were a protecting shield for any other purpose than shelter against the pressure of the cauda, it would be specially required in this species: thus its absence where the cauda does not come into relation with the œdeagus suggests very strongly that its function is protection against the pressure of the cauda.

The œdeagus.—This of all the accessory male parts is, of course, the most important, being the part most directly engaged in the process of fertilisation. But it is of all the parts the most variable; it is, indeed, so extremely different that I cannot with certainty homologise the parts in some of the forms. As instances of extremely different forms of œdeagus I may mention *Pœcilochroma lata*, *Eusthenes pratti*, *Stilida indecora*, *Edessa rufomarginata*, and *Piezosternum subulatum*. Notwithstanding the difficulties of homologising the parts of the œdeagus (which is complicated by its variable relations with the theca), I would suggest that it may ultimately prove to consist in all these insects of three parts, *viz.*, two lateral lobes similar to one another, and a single median ligula or style. But to assert this positively examinations must be made of a large number of species in a fresh condition.

The œdeagus in the *Pentatomidæ* is not capable of being thrust out of the body as it is in Coleoptera; it consists of two arms, the basal one of which is fastened to the floor of the terminal segment; to this basal portion the part of the œdeagus usually visible is fastened by a transverse joint. In repose this outer part of the œdeagus is bent up and so concealed, while for the purpose of copulation it is deflexed; if it exercise any movement during copulation—which appears to me very doubtful—it must be that of elevation or depression of the part external to the transverse joint.

The true intromittent organ, as seen in *E. pratti*, is a very elongate, transparent tube, similar to a glistening white thread; its great length is very remarkable.

IV. *General remarks.*

Although very little can be said as to the special functions of the parts I have described, and although it is as yet very difficult to form any idea likely to be of importance as to the reason of their existence, yet there

are some points of interest that may be alluded to with advantage.

The great variety seen is most remarkable. The forms I have described are merely such as I happened to have at hand, and were not selected to give any idea of the variety that exists in the *Pentatomidæ;* indeed, they do not do so, for I have, since the descriptions were made, examined a few other members of the family, and find some of them to be quite different from anything here delineated. They are also very different from anything that exists in Coleoptera, and no similar system of arrangement of the parts has been described, so far as I know, in other insects.

Another point that strikes the attention is the fact that in some species, especially in the genera *Edessa* and *Nezara*, the structures appear to be of an ornamental character.

On comparing a heteropterous hemipteron with a male insect of another order—a beetle, say—an important difference will be observed, *viz.*, that one whole segment of the body is greatly separated from the other segments, and entirely devoted to the reception of the male parts, but the parts are not withdrawn completely into the body; indeed, the greater portion of the segment is exposed, and the part of it in which the structures I have described are situated is left uncovered, except by the membranous tips of the upper wings. It must be noted, too, that in all cases where there is a complex ornamentation of the parts, they are freely exposed, and not covered by the tips of the wing-cases. In the *Scutellerinæ*, where the scutellum assumes such extraordinary dimensions that it entirely covers the body, the terminal segment is, like the other parts, covered by the monstrous scutellum; but in the *Plataspinæ*, where the scutellum is quite as greatly developed as it is in the *Scutellerinæ*, perhaps even more so, the parts are not covered by it, but are exposed on the perpendicular extremity of the body, or are even placed on the under surface; and in *Edessa* and *Nezara* the posterior aspect of the segment is not covered in any way, though apparently it can be concealed occasionally by bending down the delicate tips of the wings which usually project beyond it.

It may be proper here to notice that in the male

Pentatomidæ the segment preceding the genital segment is also highly modified for sexual purposes, being greatly diminished in size, and, in fact, differentiated almost entirely for the purpose of forming a remarkably perfect articulation at the base of the genital segment. It is, in fact, in the normal condition of repose, quite concealed between the terminal and the ante-penultimate segments, so that there appears to be one segment less in the male than there is in the female, both on the dorsal and ventral aspects. In some species,—those of the genus *Tesseratoma*, for example,—there is a stigma present on this rudimentary segment, proving it to be a true segment, and not a mere articulating ring.

The extreme difference between the arrangement and general conditions of the male parts in the *Pentatomidæ* and the Coleoptera is, I believe, correlative with a different method of copulation in the two orders. In the Coleoptera it is the rule that the male is placed above the female during coupling, while in the Hemiptera-Heteroptera the general rule seems to be that the male creeps beneath the female : in this latter sex the vulva is invariably placed quite on the under surface of the body, and not in the last segment of the body, but in that preceding it; and the general arrangement of the parts in the other sex are evidently correlatively modified.

The most striking of the special features of the genital segment is the peculiar development of the alimentary canal. The chief function of this rectal-cauda is to protect the œdeagus, which lies completely beneath it. For this purpose the under side of the rectal-cauda is hollowed by a large cavity, and the part of this cavity immediately above the œdeagus is reduced to the consistency of a delicate membrane ; thus the calibre of the canal of the interior of the cauda is entirely contracted at this spot, so that a very remarkable protecting cap for the œdeagus is obtained at the cost of obstructing the canal to such an extent that passage of excrementitious matter can only be made by either depressing the œdeagus or by raising the cauda off the œdeagus.

It appears to be a great comfort or advantage to insects to be able to withdraw and cover over some of the sensitive parts of the body during repose, or when the parts are not in use ; for this purpose a very large

number of Coleoptera are provided with special cavities, in which they can withdraw the sensitive portions of the antennæ; and in many cases complete protection is obtained for the sensitive parts of the mouth by various modifications for retracting the mouth within the thoracic cavity, or under protection of a projecting part of the thorax (the chin-piece in *Histeridæ* and *Elateridæ*, for example), or by inflecting the head in a peculiar manner. The modifications of some parts of the skeleton for these purposes is truly marvellous, as any one who has examined the extraordinary modifications of the sternum in the *Anobiidæ* will admit; and it is therefore quite consistent with what we find to obtain in insect economy that the alimentary canal at the other extremity of the body should be made to protect the œdeagus, and the fact justifies us to some extent in inferring that the œdeagus, or some part of it, is a sensitive organ; but it is, on the other hand, equally probable that the delicate structures of the œdeagus are covered simply to preserve them from injury.

I have stated, in speaking of the rectal-cauda, that in many forms it does not extend to the extremity of the body, but terminates in the middle of the genital segment. This certainly is a very curious arrangement, and at present I am not able to state any incontrovertible reason for the abbreviation. Evidently the cauda,—*i. e*, the alimentary canal,—ought to extend to the extremity of the body; for it does so in the female *Pentatomidæ* in a conspicuous manner, and it does so in the males of many species. It would hence appear that its abbreviation in some forms must be looked on as a departure from the natural arrangement of the parts. And it must be considered a very peculiar departure, for it is difficult to understand how in such cases the excrementitious matter is extruded entirely from the body. Mr. Champion tells me that he is under the impression that some bugs have the power of forcibly ejecting the excrementitious matter by a sort of squirting process; but if this be the method employed in the *Scutellerinæ*, it must be accompanied by a process of simultaneously spreading the wings so as to get their tips out of the way, while at the same time the genital segment must be greatly exserted so as to extend it beyond the tip of the scutellar covering of the body. I have

little doubt, however, that this segment is capable of being so extended, for it is by such an extension that I presume the process of coupling to be rendered possible. Still, there are other considerations that make it difficult to believe that in these *Tesseratominæ* and *Scutellerinæ* the alimentary canal can have become shortened by a process of evolution. Without referring to these more particularly at present, I will content myself with saying that it appears more probable that the original termination of the genital segment was at the line of the diaphragm, and that the part posterior to this—that is, the posterior chamber, in which the external male parts are situated—is a subsequent growth that has taken place *pari passu* with the evolution of the male parts for the purpose of their protection. If so, then both the posterior chamber and the peculiar modifications of the rectal-cauda are to be looked on as having as their objective result the protection of the œdeagus.

With reference to the special function of the lateral appendages and the inferior process, I can only make vague suggestions which actual observation may probably prove to be erroneous. Where the inferior process is specially developed, it perhaps determines the exact direction the œdeagus shall take when it is deflexed. The function of the lateral appendages is at present more obscure, but they are always present, and probably play an important part in the act of copulation. I have stated that they are connected together by a powerful ligament pressing on the back of the theca of the œdeagus, and, on breaking up a specimen of *Eusthenes pratti*, I find that this is just at the spot where the ejaculatory canal passes into the theca; it is therefore quite probable that the lateral appendages have a controlling power over the passage of the seminal fluid.

I see no reason for considering, with any great probability, that any part of the structures are clasping or holding instruments. I look on them as (1) for protection of the sensitive parts from pressure, (2) for the exclusion of parasites, (3) as directing instruments to determine the exact direction of movement of the true intromittent organs, and (4) as probably instruments for altering the pressure on the ejaculatory canal at its point of entrance into the œdeagus; but the superior lateral processes, which are only present in some species,

and are always fixtures, may be of the nature of supports or holdfasts. My suggestion as to the protective functions of some of the parts is, I think, of importance; this, indeed, is probably one of the reasons why the structures I have been speaking of differ so much in their general arrangement from what they do in the other orders of insects. In the Coleoptera, for instance, protection is obtained by withdrawing the whole of the male organs and their accessory parts into the interior of the body; whereas in the Hemiptera the organs are not withdrawn into the body to an extent sufficient to protect them; and it appears probable that the cavity in which they are lodged is a special outgrowth for their protection and accommodation. According to embryological data obtained in other insects the œdeagus was originally, wholly or in part, an external organ of the nature of an appendage, and if this be the case, the mode of evolution of forms in which it is now drawn completely —with all its complex accessory parts—into the interior of the body must have been totally different from the development in the Hemiptera, where it remains homologically an external organ, with special arrangements for covering it.

The æsthetic aspect of the arrangement in many of the higher species, such as *Catacanthus*, *Nezara*, and *Edessa*, is very remarkable, but I do not think there is at present evidence that would justify us in attaching any special biological importance to it. It certainly is a most remarkable fact that the posterior part of the alimentary canal should be used as an external organ for the protection of other parts, and that it should become adorned with bosses and projections symmetrically formed and elegantly ciliated; and the idea is almost suggested that these peculiarities are of use in producing some impression on the other sex. But I think this idea may be dismissed as in all probability quite untenable.

Not the least curious point in these organs is the great variety of forms they present. The variations in the shapes of the lateral appendages and of the inferior process are truly extraordinary, but they are insignificant as compared with the extreme differences that exist in the œdeagus itself. If this organ, as seen in *Eusthenes pratti*, in *Stilida indecora*, *Edessa rufo-marginata*, *Pœcilo-*

chroma lata, and *P. hardwicki*, be compared, it will be understood how difficult it is to recognise the homologous parts; and it is not easy to see how such very different organs can have the same function. Indeed, the great variety existing in so important a part, and one so closely connected with the continuance of the species, will, I think, prove to be very difficult of explanation to those who adopt the theory of a common ancestor for species systematically allied.

Finally, I may remark that I have not observed any variation whatever in the parts in individuals of the same species.

Explanation of Plates XII., XIII., & XIV.

PLATE XII.

Fig. 1. *Tesseratoma malaya*, Stal, viewed from above; *l.a.* lateral appendage, *i.* inferior accessory process, *c.* rectal-cauda.

Fig. 2. *T. nigripes*, Dallas, viewed from above; *l.a.* lateral appendage, *i.* inferior accessory process, *c.* rectal-cauda.

Fig. 3. *T. papillosa*, Drury, viewed from above, with one of the lateral appendages, *l.a.*, partially rotated or lifted.

Fig. 4. *Eusthenes pratti*, Distant, viewed from behind and slightly from above; *l.a.* lateral appendage, *i.* inferior accessory process, *c.* rectal-cauda, *l.p.* superior lateral process.

Fig. 5. *Stilida indecora*, Stal, showing the normal position of the terminal segment, *t.s.*, when retracted.

Fig. 5 A. Terminal segment of *S. indecora*, viewed from above; *l.a.* lateral appendage, *i.* inferior accessory process, *c.* rectal-cauda.

Fig. 5 B. *S. indecora*, after the rectal-cauda, diaphragm, and one lateral appendage have been dissected off, viewed from above and a little in front; *l.a.* lateral appendage, *i.* inferior process, *o.* œdeagus consisting of semimembranous corrugated substance, *o.s.* style of œdeagus, *t.* theca.

Fig. 6. *Edessa rufo-marginata*, DeGeer, viewed from above; *l.a.* lateral appendage, *i.* inferior accessory process, *c.* rectal-cauda, *l.p.* superior lateral process.

Fig. 7. The same, viewed from behind and a little from below; the rectal-cauda is very large, and extends all along the middle of the figure: the lower part is not quite correctly rendered by the artist.

PLATE XIII.

Fig. 8. *E. rufo-marginata*, with the rectal-cauda (*c*) elevated and drawn in, and the œdeagus deflexed so that its apical part (*o*) is protruded; *a.o.* orifice of rectal-cauda, *l.a.* lateral appendage, *t.* theca.

Fig. 9. *E. rufo-marginata;* A, rectal-cauda dissected off, showing the large excavation (*h*) on its under surface for the accommodation of the extremity of the œdeagus; B, under surface of termination of rectal-cauda, showing the orifice or anal aperture *a.o.*; C, upper surface of rectal-cauda; D, œdeagus (*o.*) closely embraced by its theca (*t.*).

Fig. 10. *Piezosternum subulatum*, Fab., viewed directly from above; *c.* cauda retracted and elevated, *l.a.* presumed lateral lobes of œdeagus, *i.* inferior accessory process; the lateral appendages are not lettered, but are seen behind the lobes of the œdeagus.

Fig. 11. *Nezara* sp.? (Madagascar, Cowan); A, viewed from above; B, from behind; *c.* rectal-cauda, *l.a.* lateral appendage.

Fig. 12. The same (*Nezara* sp.?, Madagascar, Cowan), after the rectal-cauda has been dissected off, viewed from above and in front; *o.* œdeagus, *t.* theca.

Fig. 13. *Pharypia pulchella*, seen from behind and slightly from below. The artist has not succeeded with this figure; the parts being all deep black, it is rather difficult to see the outlines.

Fig. 14. *Edessa* sp.? (Corrientes), showing the ornamented rectal-cauda extending all along the middle of the segment.

Fig. 15. *Edessa cornuta*, Burm., viewed from behind; *c.* rectal-cauda, *l.a.* lateral appendage, the shape of this latter not correct.

Fig. 16. *Nezara viridula*, L. (Madagascar), viewed directly from behind; *c.* rectal-cauda, *l.a.* lateral appendage.

Fig. 17. *N. marginata*, De Beauv., viewed from behind and a little from one side; *c.* the large and complicated rectal-cauda.

Fig. 18. *Megarhynchus limatus*, H.-S., viewed from behind.

Fig. 19. *Acanthosoma* (*Cyphostethus*) *tristriatus*, viewed from behind; *l.a.* lateral appendage, *c.* rectal-cauda.

Fig. 20. *Catacanthus incarnatus*, Drury; *c.* ornament on rectal-cauda.

PLATE XIV.

Fig. 21. *Pœcilochroma lata*, seen from above; *o.* œdeagus, *c.* the very short rectal-cauda.

Fig. 22. *P. lata*, seen from behind.

Fig. 22 A. *P. lata*, œdeagus, lateral view; *o.* œdeagus proper, *t.* presumed theca.

Fig. 22 B. *P. lata*, œdeagus proper, posterior aspect.

Fig. 23. *P. hardwicki*, seen from behind; *l.a.* lateral appendage (form incorrect), *d.* diaphragm, *c.* rectal-cauda, *h.* horns attached to cauda, *i.* terminal orifice of cauda.

Fig. 24. *Chrysocoris ornatus*, Dall., viewed from behind; *l.a.* lateral appendage, *c.* cauda. Bad figure.

Fig. 25. *Calliphara obscura*, viewed from above and a little in front; *c.* rectal-cauda, *l.a.* lateral appendage.

Fig. 26. *Brachyplatys* sp.? (from Old Calabar), viewed from behind; *c.* rectal-cauda, *l.a.* lateral appendage (figured too large and projecting too much downwards).

Fig. 27. *Brachyplatys* sp.? (Marosika, Madagascar, Cowan), viewed from behind and slightly from below; *c.* rectal-cauda, *l.a.* lateral appendage.

Fig. 28. *Taricha nitens*, viewed from behind and slightly from below; *c.* rectal-cauda, *l.a.* lateral appendage (too large and prominent).

XIII. *On the classification of the* Pyralidina *of the European fauna.* By Edward Meyrick, B.A., F.Z.S.

[Read April 2nd, 1890.]

Plate XV.

When Professor Fernald was in England last year he expressed a desire that I would work out the classification of the *Pyralidina* of the European fauna. He pointed out that the generic nomenclature was in a state of great confusion, owing to the misappropriation or neglect of the names used by older authors, that, as a means to the removal of these abuses, the generic definitions required a thorough revision and correction —Lederer's classification, now nearly thirty years old, the only one based on an adequate examination of structure, is not founded on modern principles, and contains more actual errors of observation than is generally known,—and that the work was of great importance, as the classification of the species of any part of the world must always be based on a knowledge of those of the European region, which were the first worked out. Thus he himself stood in immediate need of the work for his forthcoming paper on the *Pyralidina* of North America. This paper has been written in accordance with his request, and he concurs in the general principles on which I have worked, and agrees with the main results obtained, although he is of course in no way committed to an entire approval of all the details.

The species here included are those which inhabit the region of the European fauna in the sense in which the term is used by Staudinger in his Catalogue, except that I have excluded the Labradorian species; if these are included, a large part of Canada has an equally good claim, and they will moreover, in any case, be worked out by Professor Fernald. The region as so defined is a reasonably convenient one for delimitation, but I would not be understood to express any belief in its

natural separation; on the contrary, I cannot but think that no natural line of separation between Eastern Siberia on the one hand, and Japan and North China on the other, is capable of being drawn. Probably, however, on accurate investigation, we should find that there is no natural line anywhere.

It will be well to mention here some of the general rules of classification. No genus, family, or higher group, is tenable unless distinctly separable from all others by points of structure, which, whether singly or in conjunction, are capable of accurate definition. If a systematist is not able to define by a clear and not simply comparative character the distinction between two genera, he is bound to merge them together; thus, to say that in one the cell is short and in another long, is no sufficient definition; to say that in one the cell is less than one-third of the wing in length, and in another more than one-third, is sufficient, if found constant and clearly perceptible, but in practice it would probably be a very bad character, as probably some species would be transitional. Even where transitional forms are not known, it will always be necessary to use judgment as to whether the distinction employed is of such a character as to be likely to hold good in the event of the discovery of additional species. But even where there is a good and definable point of distinction, it does not follow that the genera are to be maintained; where genera are small and numerous, it becomes intrinsically undesirable to multiply them, and in such a case, if two small genera agree in nearly all structural characters, resemble one another superficially, are apparently closely connected genealogically, and finally are capable of accurate definition and distinction as a single whole, then they ought in general to be united. Many structural characters are variable, either in different specimens of the same species, or sometimes in a transitional series of closely allied species. I hope shortly to give a paper on the classification of the European *Geometrina*, and shall then give some remarkable and, I believe, unprecedented statistics of the variation of structural characters, but many instances will be found in the following genera. The same point of structure will often be found available as a good and reliable distinguishing character in one instance, and not in another; this can

never be determined except by actual consideration of the particular circumstances. Nor can it be said beforehand what characters are likely to be good; perhaps the most suspicious are tufts of hairs, especially when developed as secondary sexual characters, when they are often unreliable.

In the use of generic names I have followed the now generally received practice of adopting the generic name under which a species of the genus was earliest described, except where such name has been preoccupied in a different sense by another author; subsequent limitations being accepted so far as they restrict the meaning of a generic name in accordance with my definition of the genus. The misuse of some older names is largely due to an indiscriminate following of Treitschke. To give one or two conspicuous instances, the genus *Botys* was founded by Latreille to include two species only, now passing as *Lythria purpuraria* and *Hydrocampa nymphæata*; it must be long since either of these species was included by any writer in *Botys*, but clearly one or other must be the actual type; I hold it to be *purpuraria*. *Scopula*, Schrk., was founded to include *stratiotata* and *dentalis*, and is a synonym of *Nymphula*. Both these names were subsequently used by Treitschke in a quite different sense, for which there is no authority. *Alucita* and *Pterophorus* are also instances of generic titles much abused. In some instances a generic name has been orthographically wrongly written in the first instance; I have concurred in the prevalent view that, in the interests of permanence, such an error is not to be corrected, as it opens up an unending possibility of confusion, except where it is a mere printer's error for which there is evidence (see *Psammotis*). In specific names the necessity for absolute literal permanence does not exist to the same acute degree, and corrections may, I think, be sometimes made here, when the error is slight and the intention of the writer obvious. But I hold that it conclusively follows from this that, if a generic name is not liable to modification in the slightest degree, then any original difference, even one of the termination only, is sufficient to constitute two names distinct for separate use. Indeed, as it has hardly ever been proposed to alter the termination of any generic name, there is no probability of con-

fusion. Hence I retain *Euchromius*, Gn., although there is a previously existing genus *Euchromia*, Hb. ; *Cynæda*, Hb., although there is an earlier *Cynædus*, Gron. ; *Notarcha*, Meyr., notwithstanding the existence of *Notarchus*, Cuv. This is obvious, for if we once begin to alter on the general ground of nearness, there is again no limit to the possibility of change, as no actual line of demarcation can be drawn between forms which are too near, and those which are near but not too near ; thus, to quote an actual instance, Lederer considers *Achatodes* and *Agathodes* to be too near, though originating from totally different root-words. No doubt such names as those mentioned above ought not originally to have been formed, just as names which offend against orthography ought not to have been formed ; but once formed, they must be maintained if we are to be logical. It is expressly urged by those who maintain the literal permanence of original generic names that the form is everything and the meaning nothing, and the application of this principle is here undoubted.

In the following list of species I have ventured to mention some at present unpublished species of Dr. Staudinger (marked List XXXIII), which, as he says, are contained in all the principal collections under the names employed. It is, I admit, a reprehensible practice, but as the species are really pretty well known, and are also well-marked and distinct, I thought it best to acknowledge their existence and fix their classification. In the specific nomenclature I have not entered at all into the subject of synonymy or correction of names, as it does not appear to bear on the present subject ; I have therefore simply employed the name in general use, and have not mentioned synonyms except in a few instances, where I have merged established species. Neither have I troubled to investigate the specific distinctness of some doubtful forms. Those species marked with an asterisk (*) are unknown to me ; I am not at present able to visit continental collections, and have not found it possible to obtain a sight of them by other means ; fortunately they include hardly any species of importance in generic nomenclature ; my paper may therefore be regarded as practically complete. Although only my conclusions as to the European fauna are given here, it must be understood that I have re-examined for

the purposes of this paper my entire exotic collection, and that these conclusions are based upon and are consistent with the whole of this material; hence my investigation is not liable to the charge of incompleteness in this particular.

PYRALIDINA.

Ocelli usually present. Tongue usually well-developed. Maxillary palpi usually well-developed. Fore wings with vein 1 usually simple, sometimes more or less furcate at base, 5 more or less closely approximated to 4 or sometimes remote yet nearer 4 than 7, 8 and 9 stalked, or separate in *Siculodidæ* and *Agdistis* only, 11 from beyond middle of cell. Hind wings with frenulum developed, veins 1*a*, 1*b*, 1*c* all present, simple, or 1*a* sometimes absent (*Pterophoridæ* and *Orneodidæ*), 5 more or less closely approximated to 4 or sometimes remote yet nearer 4 than 7, 6 and 7 stalked or sometimes rising separate, 8 rising free and remote from cell, gradually descending so as to be closely approximated to 7 for a short distance near beyond its origin, or more usually anastomosing with it, thence rapidly diverging again.

This group has no direct relationship to the *Noctuina* and *Geometrina*, next which it is usually placed; nor yet to the *Tortricina* and *Tineina*, which constitute a radically different line of development. The structure of vein 8 of the hind wings is sufficient to distinguish it from them all. Its real origin is from an early form of the *Bombycina*, probably approaching *Heterogenea* more nearly than any form known to me, though *Heterogenea* will not in fact fulfil all the requirements of the ancestral form; probably also there is some affinity with *Thyris*. The connecting-link and earliest form of existing *Pyralidina* appears to be the *Siculodidæ*, a family not found within the region of the European fauna, in which veins 8 and 9 of the fore wings are usually separate though occasionally stalked.

The ocelli are often stated by systematic writers to be absent, when in fact they are only concealed by the scales; as, for example, in *Calamotropha*, where they are seen to be well-developed on removal of the scales covering them. The length of the antennæ is given in terms of the length of the fore wings; thus antennæ three-fourths means that they are equal in length to three-fourths of the extreme length of the fore wings. The length of the ciliations of the antennæ is given in terms

of the breadth of the stalk of the antennæ; thus ciliated ($\frac{2}{3}$) means that the ciliations are equal in length to two-thirds of the breadth of the antennal stalk at the corresponding point. The antennæ are said to be ciliated when they are furnished with short hairs arranged in a single or double regular series. When these are long, they are usually collected into small fascicles or bundles at the joints, but are still arranged in a regular series. They are often very short, and only perceptible with a good lens, but it is extremely rare for them to be quite absent in the ♂, though often said to be so by careless observers. Sometimes in such a case the antennæ are called pubescent, but this is again quite a wrong use of the term, which should only be used where the short hairs (pubescence) are distributed over the whole surface of the antennal stalk, not confined to a regular series; this structure is unusual. The maxillary palpi have been much overlooked, even Lederer declaring them absent in not a few cases where they are fairly developed; in nearly all the families they are almost always present. When very short they lie at the base of the tongue between the labial palpi, and are thus hard to perceive. The abdomen of the ♂ is usually furnished with a more or less developed exterior apical tuft, called the anal tuft; but sometimes, as in *Margaronia*, there is a dense exsertible interior tuft, attached to the genitalia, which I have called the genital tuft. I have not used the genital organs as generic characters, because, after examining a good many species for this paper, I came to the conclusion that those structures which I had previously thought of value were not constant either in families or genera; often in closely allied species quite extraordinary differences occur; thus *Talis* may be quoted as an instance of a genus where all the species show a remarkable range of difference in the structure of these organs. I cannot, in fact, give a single case of two natural genera which could be separated by a point of structure of the genitalia themselves. In the fore wings vein 1*a*, the lowest of the normal three free inner-marginal veins, at first diverges considerably from vein 1*b*, but presently curves round and runs directly into 1*b*, where it terminates; this structure appears constant, but is often hard to observe, because the vein becomes extremely faint and fine towards its termination. This

curious structure appears to be characteristic of the *Pyralidina;* at least I have never observed it in any other group, but have perhaps not searched sufficiently. Vein 1*b* is often shortly or obsoletely furcate at base in some families, especially the *Pyralididæ;* this was certainly an aboriginal character of the whole group, but has now disappeared very generally; in those genera where it is found it appears to be quite unreliable as a character for definition, being frequently present in some species, and not in others; I have therefore not employed it as a generic character for separation. Vein 1*c* is obsolete. In the hind wings veins 1*a*, 1*b*, 1*c* are all present; but in some of the genera with fissured wings, where the neuration becomes extremely degraded, one or more of these veins tend to disappear. In neither fore wings nor hind wings are there any additional bars or veins, such as sometimes exist as a survival in some ancestral forms (*e. g.*, the *Hepialidæ*). The relative breadth of the hind wings is given in terms of the greatest breadth of the fore wings; thus hind wings over 1 means that the hind wings are broader than the fore wings.

It will be seen that I have sunk the *Epipaschiadæ* in the *Pyralididæ*, and the *Hydrocampidæ* and *Scopariadæ* in the *Pyraustidæ*, having found that on an extended comparison no distinctive character could in these cases be relied on as constant.

The generic classification of the *Phycitidæ* and *Galleriadæ* is not given here; M. Ragonot has been for many years at work on these families, and it would seem wise to wait for the publication of his results, of which a part is promised this year. Should I find that his views do not satisfy me, it will then be time enough to publish my own.

I desire to record my gratitude to those entomologists who have kindly assisted me with specimens or otherwise; particularly to Prof. Fernald, who has been good enough to furnish me with his valuable opinion on many troublesome points, and to Mr. Geo. Baker, who enabled me to have the advantage of inspecting his extensive collection of *Crambidæ*, and Dr. Jordan's equally full collection of *Pterophoridæ*.

Tabulation of Families.

1.	Fore wings and hind wings six-cleft	8. Orneodidæ.
	Fore wings and hind wings not six-cleft	2.
2.	Hind wings with well-defined pecten of hairs on lower margin of cell towards base	3.
	Hind wings without defined pecten on margin of cell	5.
3.	Fore wings with vein 7 absent	4. Phycitidæ.
	Fore wings with vein 7 present	4.
4.	Maxillary palpi triangularly scaled	6. Crambidæ.
	Maxillary palpi not triangular	5. Galleriadæ.
5.	Hind wings with vein 5 remote from 4	6.
	Hind wings with vein 5 closely approximated or from point with 4	7.
6.	Hind wings with vein 8 anastomosing with 7	2. Musotimidæ.
	Hind wings with vein 8 free	7. Pterophoridæ.
7.	Fore wings with vein 7 rising out of 8	3. Pyralididæ.
	Fore wings with vein 7 separate	1. Pyraustidæ.

1. PYRAUSTIDÆ.

Ocelli distinct, or very rarely obsolete. Tongue well-developed, or rarely obsolete. Maxillary palpi well-developed, or rarely rudimentary. Fore wings with vein 1 simple or rarely obsoletely furcate at base, 4 and 5 closely approximated at base or rarely stalked, 7 separate from 8, 8 and 9 stalked. Hind wings without defined pecten of hairs on lower margin of cell (but sometimes with loose scattered hairs), veins 4 and 5 closely approximated at base or from a point or stalked, 7 rising out of 6 near base or rarely separate but closely approximated, anastomosing with 8.

The ancestral form of this family is most nearly represented by *Scoparia* and *Heliothela*, at which point a common origin with the *Crambidæ* is indicated. From this point there appear to be two main lines of descent; one by way of *Titanio*, *Loxostege*, *Pyrausta*, *Notarcha*, to *Margaronia*; the other by way of *Metasia*, *Hydrocampa*, *Schœnobius*, to *Acentropus*. The *Phlyctænia* group is a lateral branch from *Pyrausta*, and the group of *Euclasta* and *Nausinoe* a lateral branch from *Metasia*. It will be found that on this scheme the remaining genera here given can be easily fitted in as intermediate steps or short lateral offshoots; the relation of each genus is usually given under its own head.

The family is largely represented almost everywhere, but especially within the tropics, where it becomes a

dominant group, abounding in genera and species. Many species ranging into the South European or Central Asiatic regions are outlying stragglers from tropical genera, and hence many genera figure in the list which have small claim to a Palæarctic origin.

Tabulation of Genera.

1. Posterior tibiæ in ♂ with outer middle-spur rudimentary, almost obsolete .. .. 2.
   Posterior tibiæ in ♂ with outer middle-spur developed .. .. 5.
2. Fore wings with vein 10 rising out of 9 or (abnormally) coincident .. .. 3.
   Fore wings with vein 10 rising separate .. .. 4.
3. Face with acute conical horny projection .. .. 12. Sclerocona.
   Face without projection .. .. 10. Perinephela.
4. Face with short rounded prominence .. .. 11. Algedonia.
   Face without prominence .. .. 13. Phlyctænia.
5. Fore wings with vein 10 rising out of 9 .. .. 6.
   Fore wings with vein 10 rising separate, rarely anastomosing with 9 .. .. 13.
6. Ocelli obsolete .. .. 46. Cataclysta.
   Ocelli distinct .. .. 7.
7. Tongue obsolete .. .. 47. Donacaula.
   Tongue developed .. .. 8.
8. Fore wings with upturned scale-pecten from vein 1 near base beneath .. .. 37. Duponchelia.
   Fore wings without pecten on vein 1 .. .. 9.
9. Fore wings in ♂ with veins 7 and 8 curved apart near base, enclosing rough depression beneath 25. Pelæa.
   Fore wings in ♂ with veins 7 and 8 normal. .. 10.
10. Posterior tibiæ in ♂ with outer middle-spur $\frac{1}{6}$ of inner .. .. 9. Eurrhypara.
    Posterior tibiæ in ♂ with outer middle-spur $\frac{1}{2}$—$\frac{2}{3}$ of inner .. .. 11.
11. Labial palpi ascending .. .. 45. Nymphula.
    Labial palpi porrected .. .. 12.
12. Antennæ $\frac{1}{2}$ to almost 1 .. .. 39. Stenia.
    Antennæ $\frac{2}{3}$ .. .. 17. Psammotis.
13. Face with more or less strong horny prominence .. 14.
    Face without horny prominence .. .. .. 18.
14. Frontal prominence with a vertical edge .. .. 21. Cornifrons.
    Frontal prominence without vertical edge .. .. 15.
15. Frontal prominence bounded beneath by a flat anteriorly emarginate plate .. .. .. 23. Titanio.
    Frontal prominence without flat plate beneath .. 16.
16. Fore wings with large scale-tooth on inner margin 24. Cynæda.
    Fore wings without large scale-tooth .. .. 17.

17. Frontal prominence conical, more or less pointed 22. Loxostege.
Frontal prominence pustule-shaped .. .. 34. Metasia.
18. Antennæ in ♂ bent, with tuft of scales on bend 35. Nacoleia.
Antennæ in ♂ without tuft .. .. .. 19.
19. Antennæ in ♂ with stalk notched above basal joint .. .. 4. Hymenia.
Antennæ in ♂ with stalk not notched .. .. 20.
20. Abdomen in ♂ with large dense exsertible genital tuft .. .. 21.
Abdomen in ♂ without such tuft .. .. .. 23.
21. Thorax in ♂ with patagia elongate, terminating in an expansible pencil of scales .. .. 3. Omiodes.
Thorax in ♂ with patagia normal .. .. 22.
22. Fore wings with vein 7 closely approximated to 9 at base only .. .. 2. Paratalanta.
Fore wings with vein 7 closely appressed to 9 on basal fourth .. .. 1. Margaronia.
23. Thorax in ♂ with patagia forming erect spreading hair-tufts .. .. 49. Scirpophaga.
Thorax in the ♂ with the patagia normal .. 24.
24. Hind wings with veins 6 and 7 separate at origin 31. Prochoristis.
Hind wings with veins 6 and 7 from a point or stalked .. .. 25.
25. Antennæ $\frac{1}{3}$—1 or more .. .. 26.
Antennæ $\frac{2}{3}$ or less .. .. 30.
26. Antennæ longer than fore wings .. .. .. 43. Euclasta.
Antennæ not longer than fore wings .. .. 27.
27. Labial palpi ascending .. .. 28.
Labial palpi porrected .. .. 29.
28. Terminal joint of labial palpi with triangular tuft in front .. .. 40. Hydriris.
Terminal joint of labial palpi not tufted .. .. 42. Nausinoe.
29. Anterior femora and tibiæ in ♂ rough-haired .. 41. Antigastra.
Anterior femora and tibiæ in ♂ not rough-haired 38. Ischnurges.
30. Thorax in ♂ with hair-pencil, covered with flat scales, from beneath hind wings .. .. 8. Pleuroptya.
Thorax in ♂ without such hair-pencil .. .. 31.
31. Labial palpi ascending .. .. 32.
Labial palpi porrected .. .. 36.
32. Terminal joint of labial palpi with triangular tuft in front .. .. 33.
Terminal joint of labial palpi not tufted .. .. 34.
33. Posterior tibiæ with outer spurs half inner .. 5. Agrotera.
Posterior tibiæ with outer spurs nearly equal inner .. .. 33. Hellula.
34. Terminal joint of palpi short, thick, obtuse .. 7. Notarcha.
Terminal joint of palpi moderate, slender, generally pointed .. .. 35.
35. Hind wings in ♂ with oval depression in cell .. 6. Satanastra.

Hind wings in ♂ without depression .. .. 44. Hydrocampa.
36. Labial palpi dilated towards apex .. .. .. 50. Acentropus.
Labial palpi not dilated terminally .. .. 37.
37. Maxillary palpi triangular, or with well-defined dilation towards apex .. .. 38.
Maxillary palpi filiform, or with apex loosely penicillate .. .. 43.
38. Terminal joint of labial palpi more or less exposed, distinct .. .. 39.
Terminal joint of labial palpi concealed in scales of second .. .. 41.
39. Labial palpi with second joint more or less tufted towards apex beneath .. .. 40.
Labial palpi with scales evenly diminishing throughout .. .. 48. Schœnobius.
40. Hind wings with veins 4 and 5 from a point or stalked .. .. 27. Scoparia.
Hind wings with veins 4 and 5 approximated at base .. .. 26. Heliothela.
41. Middle tibiæ in ♂ dilated, usually with tuft of hairs in groove .. .. 20. Mecyna.
Middle tibiæ in ♂ normal .. .. 42.
42. Maxillary palpi forming a loose spreading tuft .. 30. Mesographe.
Maxillary palpi forming an acute projecting tuft beneath .. .. 32. Cybolomia.
43. Head, palpi, and femora clothed with rough long hairs .. .. 15. Metaxmeste.
Head, palpi, and femora at most with moderate projecting scales .. .. 44.
44. Maxillary palpi nearly equal to labial .. .. 29. Evergestis.
Maxillary palpi much shorter than labial .. 45.
45. Terminal joint of labial palpi exposed, distinct .. 46.
Terminal joint of labial palpi concealed in scales of second .. .. 47.
46. Antennæ of ♂ very shortly ciliated ($\frac{1}{4}$) .. .. 28. Orenaia.
Antennæ of ♂ ciliated with fascicles ($1\frac{1}{2}$—2) .. 36. Diasemia.
47. Posterior tibiæ with outer spurs almost equal inner .. .. 16. Isocentris.
Posterior tibiæ with outer spurs $\frac{1}{3}$—$\frac{2}{3}$ of inner, or rarely less .. .. 48.
48. Fore wings in ♂ with groove near base covered above with scales .. .. 19. Microstega.
Fore wings in ♂ without groove .. .. .. 49.
49. Hind wings $1\frac{1}{3}$—$1\frac{1}{2}$ .. .. 14. Nomophila.
Hind wings hardly over 1 .. .. 18. Pyrausta.

1. Margaronia, *Hb.*

Face slightly rounded, oblique; ocelli distinct; tongue developed. Antennæ four-fifths, in ♂ filiform, ciliated ($\frac{1}{2}$—1). Labial palpi

moderate, subascending, second joint with dense projecting scales beneath, often longer and forming a pointed tuft forwards, terminal joint concealed. Maxillary palpi rather short, dilated terminally with dense scales, obliquely truncate. Abdomen in ♂ with large dense exsertible genital tuft. Posterior tibiæ in ♂ with outer spurs one-sixth to one-half of inner. Fore wings with vein 7 closely approximated to 9 on basal fourth, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third to two-fifths.

A characteristic Indo-Malayan genus of some extent, of which stragglers are found in the warmer parts of other regions. I have united under this title *Margarodes*, Gn., and *Glyphodes*, Gn., between which I can find no structural distinction. The genera *Cydalima*, Ld., *Stemorrhages*, Ld., *Pachyarches*, Ld., *Enchocnemidia*, Ld., *Sisyrophora*, Ld., *Cryptographis*, Ld., and probably others also (besides *Chloauges*, Ld., *Pygospila*, Gn., and *Heterocnephes*, Ld., which I had already merged in the above), ought, I think, also to fall into this genus; I am acquainted with all those mentioned, and they agree in all the characters of the generic definition given above, but differ variously in the possession of tufts or scale-thickenings on the legs, antennæ, abdomen, or wings, and sometimes situations in the antennæ. These characters seem to me to be here of specific value only; the natural classification of the species of this group is not improved, but rendered more obscure, by the creation of these small unnecessary genera; and it appears to me scientifically advantageous to include them all under one, which will even then be by no means very large.

unionalis, Hb.
nigropunctalis, Brem.
quadrimaculalis, Brem.
**melaleucalis*, Ev.
**expictalis*, Christ.

2. Paratalanta, n. g.

Face rounded, oblique; ocelli distinct; tongue developed. Antennæ four-fifths, in ♂ filiform, ciliated (½—1). Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate or short, rather dilated with scales termi-

nally. Abdomen in ♂ long, anal segment elongate, with large dense exsertible genital tuft. Middle tibiæ in ♂ dilated, enclosing tuft of hairs in groove; posterior tibiæ with outer middle-spur one-fifth to one-half of inner, outer end-spur one-half inner. Fore wings with vein 7 closely approximated to 9 at base, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings $1\frac{1}{4}$—$1\frac{1}{2}$; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

Allied to *Omiodes;* at present represented only by the two following Siberian species.

ussurialis, Brem.
heterogenalis, Brem.

3. Omiodes, *Gn.*

Face somewhat rounded, oblique; ocelli distinct; tongue developed. Antennæ three-fourths to five-sixths, in ♂ filiform, ciliated ($\frac{1}{4}$—$1\frac{1}{4}$), basal joint sometimes with a slight projection of scales in front. Labial palpi moderate, arched, ascending, second joint with dense rough projecting scales beneath, terminal joint very short, obtuse. Maxillary palpi moderate, porrected, filiform or somewhat dilated with loose scales towards apex. Thorax in ♂ with patagia elongate, ending in an expansible pencil of long hair-scales; abdomen in ♂ elongate, with dense exsertible genital tuft. Posterior tibiæ with outer spurs one-third to one-half of inner. Fore wings with vein 7 approximated to 9 towards base, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third to two-fifths.

A genus of rather limited size, of which the species seem to be scattered rather indiscriminately through the Indo-Malayan region, Pacific Islands, and Central America; in the Hawaiian Islands there is a locally developed group of them. The two here given are Indian species which range into Siberia.

tristrialis, Brem.
quadrimaculalis, Koll.

4. Hymenia, *Hb.*

Face rounded, oblique; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated ($\frac{1}{4}$—$\frac{1}{3}$), basal joint in ♂ with an erect apical spine or projection of scales on inner side, stalk notched above basal joint. Labial palpi moderate, arched,

ascending, second joint with dense projecting scales beneath, terminal joint short or moderate, more or less pointed. Maxillary palpi moderate, porrected, filiform. Abdomen in ♂ with small anal tuft. Posterior tibiæ with outer spurs one-third to four-fifths of inner. Fore wings with vein 7 approximated to 9 towards base, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third.

Allied to *Omiodes*. An Indo-Malayan genus of limited extent; of the two following species *luctuosalis* is Indian, and ranges into Siberia; *recurvalis* is now one of the most widely distributed of insects, occurring in abundance throughout the warmer regions of the whole world. Under this head are included *Zinckenia*, Z., and *Coptobasis*, Ld.; as thus constituted, the genus shows some variation in structure, but is readily known by the notch above basal joint of antennæ in ♂.

recurvalis, F.

luctuosalis, Gn.; *Zelleri*, Brem.; *Bremeri*, Wk.

5. Agrotera, *Schrk.*

Face rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated (1). Labial palpi moderate, curved, ascending, second joint with dense projecting scales beneath, flatly compressed, terminal joint moderately long, with acute triangular separate projecting tuft of scales in front. Maxillary palpi short, filiform, pointed. Abdomen in ♂ with small anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to near middle.

A small and rather isolated genus, probably representing the ultimate stage of a development from the *Notarcha* group. Besides the one European species, I am acquainted only with one Indo-Malayan, and (if *Tetracona*, Meyr., be merged, which is perhaps advisable) one Australian.

nemoralis, Sc.

6. Satanastra, n. g.

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated (½). Labial palpi moderate,

curved, ascending, second joint with loosely appressed scales, more or less rough beneath, terminal joint moderate, rather slender, pointed. Maxillary palpi short, filiform. Abdomen in ♂ with small anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths; in ♂ with median fold dilated in cell into an elongate-oval depression.

A development from *Notarcha*; a small Indo-Malayan genus, of which one species ranges into Siberia. It is included by Lederer under *Conchylodes*, Gn., and I have formerly called it by that name, but I now consider that Guenée's genus is quite distinct from it.

argyria, Butl.

7. Notarcha, *Meyr.*

Face rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform or with projecting joints, ciliated ($\frac{1}{4}$—$1\frac{1}{2}$). Labial palpi moderate, arched, ascending, second joint with dense projecting scales beneath, terminal joint short, thick, tolerably cylindrical, obtuse. Maxillary palpi moderate, porrected, filiform. Abdomen in ♂ with slender anal tuft. Posterior tibiæ with outer spurs somewhat less than one-half inner. Fore wings with vein 7 approximated to 9 near base, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to about one-third.

An extensive genus, probably Indo-Malayan in origin, but apparently now distributed throughout intertropical regions. The only truly European species is a remarkable exception; two other Indian species range into Syria and Siberia respectively.

multilinealis, Gn.
ruralis, Sc.
paleacalis, Gn.

8. Pleuroptya, n. g.

Face rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated (1). Labial palpi moderate, porrected, second joint with short dense projecting scales beneath, terminal joint short, exposed, obtuse. Maxillary palpi moderate, somewhat thick, filiform. Thorax in ♂ with an expansible tuft of

hairs, covered by a plate of flat scales, on each side from beneath base of hind wings. Abdomen in ♂ with small anal tuft. Posterior tibiæ with outer spurs one-third of inner. Fore wings with vein 7 closely approximated to 9 on basal third, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third.

A development of *Notarcha*. I am only acquainted with the one species, which ranges from Southern Europe to India.

aurantiacalis, F. R.

9. Eurrhypara, *Hb.*

Face somewhat rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated (⅓). Labial palpi moderate, subascending, second joint with short dense projecting scales, terminal joint short, tolerably exposed, obtuse. Maxillary palpi moderate, porrected, slender, filiform. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ in ♂ with outer middle-spur extremely short, one-sixth of inner, outer end-spur one-fourth. Fore wings with vein 7 from near 8, 9 and 10 out of 8; in ♂ with a thickening of dense scales between 7 and 8 on under side. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

Only the one species is known; it stands rather isolated, but has, perhaps, some relationship to the preceding, and ranges from Western Europe to Eastern Siberia. The depression, which Lederer mentions as existing between veins 7 and 9 of the fore wings in the ♂, I cannot find definitely traceable, but the genus is sufficiently distinct without this character.

urticata, L.

10. Perinephela, *Hb.*

Face rounded, oblique; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated (⅓). Labial palpi moderate, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, filiform, apex somewhat penicillate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ in ♂ with outer middle-spur rudimentary, almost obsolete, in ♀ one-half inner, outer end-spur one-half inner. Fore wings with vein 7

from near 8, 9 and 10 out of 8. Hind wings hardly over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to middle.

A development of *Phlyctænia;* the single known species occurs from Western Europe to Eastern Siberia. Lederer has accidentally misprinted Hübner's name, which is as above.

lancealis, Schiff.

11. Algedonia, *Ld.*

Face with a short rounded prominence; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated (⅔). Labial palpi moderate, porrected, second joint with dense rough projecting scales beneath, terminal joint concealed. Maxillary palpi moderate, porrected, filiform, apex somewhat penicillate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ in ♂ with outer middle-spur rudimentary, almost obsolete, outer end-spur one-fifth of inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 rather approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

A development of *Phlyctænia;* there is but one species, which ranges from Central Europe to Eastern Siberia.

luctualis, Hb.

12. Sclerocona, n. g.

Face with acute conical horny projection; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated (½). Labial palpi long, straight, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint loosely scaled. Maxillary palpi moderate, porrected, apex penicillate. Abdomen in ♂ with moderate anal tuft. Middle tibiæ in ♂ rather dilated; posterior tibiæ in ♂ with outer middle-spur obsolete, outer end-spur one-third of inner. Fore wings in ♂ with lower margin of cell upcurved, and an upwards-turned pecten of scales beneath it on lower surface, 7 contorted towards base, 8 and 9 stalked, 10 out of 8 (or abnormally absent), 11 sometimes (abnormally) out of 8. Hind wings 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

A development of *Phlyctænia;* the single species is known only from South-east Europe. Lederer founded the genus *Calamochrous* for an American species, and

placed with it this insect, which he had not seen; it is, however, totally distinct. The abnormal differences in neuration which are noted above occurred in one wing of a specimen which was normal on the other side; probably they are a monstrosity only, but I have seen only two specimens.

acutella, Ev.

13. Phlyctænia, *Hb.*

Face slightly rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated ($\frac{1}{4}$—1). Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, apex penicillate or somewhat dilated with scales. Abdomen in ♂ with moderate anal tuft. Middle tibiæ in ♂ sometimes dilated and containing tuft of hairs in groove; posterior tibiæ with outer middle-spur in ♂ obsolete, in ♀ one-half inner, outer end-spur one-half to three-fourths of inner. Fore wings with vein 7 from rather near 9, 8 and 9 stalked, 10 more or less approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

An early offshoot from *Pyrausta*. The genus is of considerable size, and is characteristic of Europe and North America, probably originating in the former; there is a locally developed group of species in the Hawaiian Islands, and one species in Australia; it has not yet been recognised elsewhere. I have previously called this genus *Scopula*, which term I now recognise to have been wrongly applied.

cilialis, Hb.
**fimbriatalis*, Dup.
languidalis, Ev.
testacealis, Z. (♂ not seen).
**gratialis*, Brem. (*gracialis*, form. prav.).
croccalis, Hb.
institalis, Hb.
confinalis, Ld.
lutealis, Hb.
ferrugalis, Hb.
elutalis, Schiff.
fulvalis, Hb.
**tritalis*, Christ.
**bipunctalis*, H.-S.; *dispunctalis*, Gn.
scorialis, Z.
**costalis*, Ev.
inquinatalis, Z. (? var. seq.).
prunalis, Schiff.
cyanalis, Lah.
orbicentralis, Christ.
**ustrinalis*, Christ.
accolalis, Z.
terrealis, Tr.
fuscalis, Schiff.
sambucalis, Schiff.

14. Nomophila, *Hb.*

Face slightly rounded, oblique; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated with fascicles ($1\frac{1}{3}$). Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi short, filiform. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs less than one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings $1\frac{1}{3}$—$1\frac{1}{2}$; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

An early developmental form of *Pyrausta*, showing in the narrowed fore wings an adaptation to a grassy habitat. The single species is practically cosmopolitan, and there is no reason to suppose it has been artificially introduced anywhere.

noctuella, Schiff.

15. Metaxmeste, *Hb.*

Head rough-haired, face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated simply or with fascicles ($\frac{1}{3}$—1). Labial palpi moderately long, porrected, second joint with very long rough projecting hairs, terminal joint concealed. Maxillary palpi moderate, porrected, apex terminating in a pencil of loose scales. Abdomen in ♂ with moderate anal tuft. Femora rough-haired; posterior tibiæ with outer spurs three-fourths of inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 approximated to 9 towards base; in ♂ sometimes with a long expansible pencil of hairs beneath from base near inner margin. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 from point with or out of 6 near origin, anastomosing shortly with 8 to one-fifth.

An early alpine development of *Pyrausta;* it has certainly no immediate relationship to the other forms included with it by Lederer under his *Hercyna*. *Catharia*, Ld., is merged in it. The species are restricted to the mountains of Europe and Asia Minor.

pyrenæalis, Dup.
sericatalis, H.-S.
schrankiana, Hoch.
phrygialis, Hb.

16. Isocentris, *Meyr.*

Face slightly rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated (1—2). Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, apex penicillate. Abdomen in ♂ with slender anal tuft. Posterior tibiæ with spurs all long and almost equal. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 approximated to 9 towards base. Hind wings 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

A small Indo-Malayan genus, of which the species range very widely. I am not sure that the following Central Asiatic species is certainly referable here, as I have only seen one specimen in indifferent condition, with the structural characters partly obscured. It is an offshoot of *Pyrausta*.

læt alis, Stgr., List XXXIII.

17. Psammotis, *Hb.*

Face somewhat rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform or serrulate, ciliated ($\frac{3}{4}$—1). Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, filiform, terminating in somewhat penicillate scales. Abdomen in ♂ with small anal tuft. Posterior tibiæ with outer spurs two-thirds of inner. Fore wings with vein 7 from rather near 8, 9 and 10 out of 8. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

A development of *Pyrausta*, consisting only of the two following European species; whether the genus is a natural or tenable one appears to me very doubtful. It would not surprise me to find that the origin of vein 10 of the fore wings from 9, which is the only distinguishing point from *Pyrausta*, is not constant, although in fact it holds in all the specimens which I have examined. The generic name is printed by Hübner *Psamotis*, but in the two collateral forms of the name given at the same time (Psammoten, &c.) the double m is used; this is also etymologically correct, and the first spelling is

therefore certainly a mere typographical error, which I have removed.

pulveralis, Hb.
hyalinalis, Hb.

18. Pyrausta, *Schrk.*

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds to three-fourths, in ♂ filiform, ciliated (½—2) or rarely naked. Labial palpi moderate, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, apex loosely penicillate. Abdomen in ♂ with moderate anal tuft. Middle tibiæ in ♂ sometimes dilated, enclosing tuft of hairs in groove; posterior tibiæ with outer middle-spur one-third to two-thirds (rarely one-fifth), outer end-spur one-half to three-fourths of inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base, rarely anastomosing with 9. Hind wings over 1; veins 3, 4, 5 more or less approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third to two-fifths.

Although representatives of this genus are found nearly everywhere, it is mainly characteristic of the temperate regions of the northern hemisphere, and is probably of European origin. The occasional anastomosis of veins 9 and 10 of fore wings is a curious form of variation, found also in *Evergestis;* no use can be made of it in classification, as both forms occur in different individuals of the same species, or even in different wings of the same specimen. The species in which I have noted this form of variation are *trinalis* and *decrepitalis*, but it may probably occur more or less rarely in others also. Hence the Hawaiian genus *Protocolletis*, Meyr., which was founded essentially on this character, should be suppressed.

trimaculalis, Stgr.
quadripunctalis, Schiff.
octomaculata, F.
nyctemeralis, Hb.
nigralis, F.
fascialis, Hb.
cingulata, L.
nigrata, Sc.
**Ledereri*, Stgr.
albofascialis, Tr.; *minutalis*, Spr.
obfuscata, Sc.
acontialis, Stgr.
pellicalis, Stgr.
castalis, Tr.
tithonialis, Z.
dotatalis, Christ.
sanguinalis, L.

purpuralis, L.
fibulalis, Christ.
falcatalis, Gn.
aurata, Sc.
**solemnalis*, Christ.
**pullatalis*, Christ.
porphyralis, Schiff.
alborivulalis, Ev.
**tendinosalis*, Brem.
cespitalis, Schiff.
limbopunctalis, H.-S.
**tesserulalis*, Christ.
mannalis, Hb.
ephippialis, Zett.
**limitalis*, Christ.
ærealis, Hb.
uliginosalis, Stph.
alpinalis, Schiff.
rhododendronalis, Dup.
nebulalis, Hb.; *? sororialis*, Hein.; *? nitidalis*, Hein.
decrepitalis, H.-S.
turbatalis, Christ. (doubtful; ♂ not seen).
olivalis, Schiff.
**hilaralis*, Christ.
numeralis, Hb.; *illutalis*, Gn.
torralis, Möschl.
murinalis, F. R.
austriacalis, H.-S.
**præpetalis*, Ld.
incoloralis, Gn.; *ruficostalis*, Ld.
repandalis, Schiff.
**varialis*, Brem.
extinctalis, Christ. (♂ not seen).
**perlucidalis*, Hb.
**perpendiculalis*, Dup.
**labutonalis*, Ld.
flavalis, Schiff.
**biternalis*, Mn.
trinalis, Schiff.
auralis, Peyer.
gracilis, Butl.; *explicatalis*, Christ.
clausalis, Christ.
moderatalis, Christ.
rubiginalis, Hb.
stachydalis, Zk.
verbascalis, Schiff.
nubilalis, Hb.
palustralis, Hb.
**appositalis*, Ld.
**crudalis*, Ld.
**lutulentalis*, Ld.
asinalis, Hb.
subsequalis, H.-S.
saxatilis, Stgr., List XXXIII.

19. Microstega, n. g.

Face rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated ($\frac{1}{2}$). Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, apex somewhat penicillate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer middle-spur one-third, outer end-spur one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base; in ♂ with a groove beneath cell near base, covered above by dense scales from upper side. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing

with 8 to two-fifths; in ♂ with a groove above cell near base, above which is a thick ridge of scales.

A development of *Pyrausta*, containing only the single European species.

pandalis, Hb.

20. Mecyna, *Stph.*

Face slightly rounded, oblique; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated ($\frac{1}{2}$—$\frac{2}{3}$). Labial palpi rather long, porrected, second joint with dense scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, triangularly dilated with dense scales, forming an angular projection at apex beneath. Abdomen in ♂ with small anal tuft. Middle tibiæ in ♂ dilated, usually containing tuft of hairs in groove; posterior tibiæ with outer middle-spur one-half, outer end-spur one-half to three-fourths of inner. Fore wings with vein 7 from rather near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

Probably an earlier ancestral form of *Pyrausta*. The genus is quite cosmopolitan, but probably comprises only a few species. The use of the generic name seems to call for some explanation; its actual history appears to have been as follows:—Guenée first formed the genus *Mecyna* to include the *polygonalis* group and *asinalis*, and communicated its character to various entomologists, without having actually published it; amongst others, to Stephens, who published it first, evidently intending it to include all the species placed in it by Guenée, but he only mentions *asinalis*, because he did not suppose any other to be British. Subsequently Guenée published his own views, having by that time come to the conclusion that *asinalis* was wrongly included; he therefore restricts it to the *polygonalis* group. It appears to me that under these circumstances *polygonalis*, which was undoubtedly regarded by Stephens as belonging to the genus, and only not mentioned for obvious reasons, is justly to be looked on as the type.

polygonalis, Hb.

21. Cornifrons, *Ld.*

Face with long horny laterally compressed acute projection, terminating in a vertical edge, or with a sharp vertical ridge only

ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated with fascicles (2). Labial palpi moderate, obliquely ascending or porrected, second joint with short or long projecting scales beneath, terminal joint exposed or concealed. Maxillary palpi rather long, porrected, filiform, apex sometimes penicillate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 closely approximated at base, or 4 and 5 from a point, 7 out of 6 near origin, anastomosing with 8 to one-third.

There is a good deal of structural difference between the two species which I have placed together here; but I think it is reasonable and possible to regard them as extreme forms of the same type, the range of variation being analogous to that of the similar genus *Titanio*. The genus is perfectly definable, and intermediate forms may probably be found hereafter. The species are both from the Mediterranean coasts.

ulceratalis, Ld.
isatidalis, Dup.

22. Loxostege, *Hb.*

Face with a rather short pointed or obtuse conical horny projection; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated (½—1). Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, filiform, apex sometimes penicillate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half to three-fourths of inner, rarely with outer middle-spur in ♂ one-sixth of inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 more or less closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 from point with or out of 6 near origin, anastomosing with 8 to one-third to two-fifths.

Characteristic of the temperate regions of the northern hemisphere, especially Europe, but stragglers occur also elsewhere. The frontal projection is always more or less clearly conical in general form, but the apex is sometimes acute, sometimes rounded, the former being more typical. This genus includes *Eurycreon*, Ld., *Phlyctænodes*, Gn., and *Ephelis*, Ld. Where, however, I have previously used the name *Eurycreon*, Ld., myself,

it has been in the sense of comprehending both this genus and *Metasia*, Gn., and in point of fact nearly all the Australian species included by me under the name are truly referable to *Metasia*.

nudalis, Hb.; *? bipunctalis*, Dup.
pustulalis, Hb.
cruentalis, Hb.
sticticalis, L.
**peregrinalis*, Ev.
Eversmanni. Stgr., List XXXIII.
**scutalis*, Hb.
peltalis, Ev.
consortalis, H.-S.
mucosalis, H.-S.
comptalis, Frr.
æruginalis, Hb.
**sedacovialis*, Ev.
**scalaralis*, Christ.
clathralis, Hb.
virescalis, Gn.
verticalis, L.
turbidalis, Tr.
sulphuralis, Hb.
palealis, Schiff.
algiralis, All.
**concoloralis*, Ld.

23. Titanio, *Hb.*

Face with short or long projecting horny plate, more or less rounded above, flat beneath, anterior edge emarginate or sometimes almost straight; sometimes with one or two short spines on side of face, and rarely with a sharp conical spine on forehead above projection; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated (1—2) or simple. Labial palpi moderate, porrected, second joint with short or long rough projecting scales beneath, terminal joint rather short, loosely scaled, sometimes almost concealed. Maxillary palpi moderate, rather short, or minute, filiform or with apex loosely penicillate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half to three-fourths of inner, legs sometimes hairy. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 rather approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 rather approximated at base, 4 and 5 sometimes stalked, 7 out of 6 near origin, anastomosing with 8 to one-third to two-fifths.

A considerable genus, especially characteristic of Central Asia, but spreading also into Europe and North America, and with two or three species in the Indo-Malayan and Australian regions. The variation in the development of the frontal projection and adjacent facial spines, and in the length of the maxillary palpi, have led to the creation of many small genera, which are not tenable on a general consideration of the whole,

as all transitional forms occur, nor does a strict collocation of forms showing a particular character bring together those which are most nearly allied. Hence I unite the whole into one easily defined genus. The stalking of veins 4 and 5 of the hind wings is not constant specifically, both forms occurring in different individuals of the same species. The genera thus merged are *Aporodes*, Gn., *Noctuomorpha*, Gn., *Threnodes*, Gn., *Noctuelia*, Gn., *Emprepes*, Ld., *Anthophilodes*, Gn., *Tegostoma*, Z., *Aeschremon*, Ld.

**conchylialis*, Christ.
Moeschleri, Christ.; *baphialis*, Ld.
**concinnalis*, Christ.
pudicalis, Dup.
pentodontalis, Ersch.
lepidalis, H.-S.
**plumbiferalis*, Christ.
**crubescens*, Christ.
turcomanica, Christ.
disparalis, H.-S.
comparalis, Hb.
alticolalis, Christ.
superba, Frr.
respertalis, H.-S.
**plebcialis*, Christ.
floralis, Hb.
**austautalis*, Oberth.
normalis, Hb.
venustalis, Ld.
magnificalis, Christ.
**modestalis*, Christ.
Staudingeri, Christ.
originalis, H.-S.
pulchellalis, Stgr., List XXXIII.
sartalis, Hb.
pollinalis, Schiff.
**cacuminalis*, Ev.
multiguttalis, Stgr.
**eponyma*, n. s.; *Moeschleri*, Roman. (nec Christ.).
heliothalis, Stgr., List XXXIII.
paschalis, Stgr., List XXXIII.
sultanalis, Stgr., List XXXIII.

24. Cynæda, *IIb.*

Face with a slight rounded prominence; ocelli distinct; tongue short. Antennæ two-thirds, in ♂ filiform, ciliated (1). Labial palpi moderately long, porrected, second joint clothed with loose scales attenuated forwards, terminal joint concealed. Maxillary palpi moderate, porrected, rather triangularly dilated terminally with loose scales. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs about one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 near base; scales of inner margin forming a large projecting tuft about one-third. Hind wings over 1; veins 3, 4, 5 rather approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third.

Allied to *Titanio;* a small genus, possibly consisting only of one geographically varying species.

dentalis, Schiff.

furiosa, Stgr., List XXXIII.

25. Pelæa, *Ld.*

Face rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ ciliated. Labial palpi moderate, porrected, second joint with rough projecting scales attenuated forwards. Maxillary palpi moderate, porrected. Abdomen in ♂ with moderate anal tuft. Fore wings in ♂ with vein 7 bent apart from 8 near base, enclosing with it a roughened depression on lower surface, 9 and 10 out of 8. Hind wings over 1; 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8.

I have not been able to see a specimen of the scarce species which composes this genus, and the characters given above are derived from Lederer; assuming their correctness, the genus is distinct enough, and must be allied to *Titanio*.

**ramalis*, Hb.

26. Heliothela, *Gn.*

Face rounded; ocelli distinct; tongue developed. Antennæ less than two-thirds, in ♂ filiform, ciliated ($\frac{1}{4}$—$\frac{1}{3}$). Labial palpi moderate, porrected, second joint with short dense projecting scales beneath, becoming longer towards apex, terminal joint moderate, stout, exposed. Maxillary palpi long, not much shorter than labial, porrected, expanded with scales towards apex, truncate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 somewhat approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-fifth to two-fifths.

A small genus, represented by scattered species in probably all the principal regions; it is in the direct line of transition between *Titanio* and *Scoparia*. The lower margin of the cell in the hind wings is sometimes so far clothed with hairs towards the base as to make a marked approach to the structure of the *Crambidæ;* yet the hairs do not form a clearly defined pecten as in that family.

atralis, Hb.

**prægalliensis*, Frey.

27. Scoparia, *Hw.*

Face rounded, vertical; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated ($\frac{1}{4}$—$1\frac{1}{2}$). Labial palpi moderate or long, porrected, second joint with long dense projecting scales beneath, terminal joint moderate, exposed, or resting in scales of second. Maxillary palpi rather long, porrected, triangularly dilated with scales. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 approximated to 9 towards base. Hind wings from over 1 to nearly 2; veins 3 and 4 remote, 4 and 5 from a point or stalked, 7 out of 6 near origin, anastomosing with 8 to one-third to two-fifths, cell without discal hairs.

A cosmopolitan genus of large size but uneven distribution; within the tropics it hardly seems to occur except at considerable altitudes; its maximum of development is reached in New Zealand. Lederer states that in *S. centuriella* vein 8 of the hind wings is free from 7; it is not so in my specimens of that species, nor is there a similar instance in any individual of those which I possess (numbering about 100 species); I judge therefore that his example must have been an unusual variety or sport.

ochrealis, Schiff.
lætella, Z.
resinea, Hw.
lineola, Curt.
angustea, Stph.
alpina, Stt.; *gracilalis*, Stt.
petrophila, Stdfs.
sudetica, Z.
**absconditalis*, Roman.
murana, Curt.
frequentella, Stt.
cratægella, Hb.
truncicolella, Stt.
valesialis, Dup.
**delphinatalis*, Gn.
**gallica*, Peyer.
**scriziatalis*, Oberth.
manifestella, H.-S.
sibirica, Ld.
phæoleuca, Z.
**staudingeralis*, Mab.
pallida, Stph.
cembræ, Hw.
Zelleri, Wk.
ulmella, Dale.
**mandschurica*, Christ.
ingratella, Z.
dubitalis, Hb.
ambigualis, Tr.; *atomalis*, Dbld.
basistrigalis, Knaggs.
incertalis, Dup.
perplexella, Z.
centuriella, Schiff.

28. Orenaia, *Dup.*

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated (½). Labial palpi moderate, porrected, second joint with short dense projecting scales beneath, terminal joint moderate, exposed, obtuse or pointed. Maxillary palpi moderate, porrected, rather thick, obtuse or pointed. Abdomen in ♂ with moderate anal tuft. Middle tibiæ in ♂ sometimes with pencil of hairs in groove; posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third.

An intermediate link between *Scoparia* and *Evergestis*. The three species are natives of the mountains of Europe.

alpestralis, F.
rupestralis, Hb.
helveticalis, H.-S.

29. Evergestis, *Hb.*

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated (½). Labial palpi short or moderate, porrected, second joint rough-scaled, terminal joint rather short, loosely scaled, somewhat pointed. Maxillary palpi as long as second joint of labial, porrected, filiform, apex somewhat penicillate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer middle-spur one-half, outer end-spur one-half to three-fourths of inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base, sometimes anastomosing with 9. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third.

A genus of moderate extent, specially characteristic of the European region, but extending also into North America. The occasional anastomosis of veins 9 and 10 of the fore wings, as in *Pyrausta*, is not a constant specific character, some specimens not showing it; the species in which I have observed it are *ænealis* and *anartalis*.

ænealis, Schiff.
subfuscalis, Stgr.
**mundalis*, Gn.
**submundalis*, Mill.
limbata, L.
**infirmalis*, Stgr.

politalis, F.
straminalis, Hb.
extimalis, Sc.
**vagabundalis*, Christ.
nomadalis, Ld.
**cæsialis*, H.-S.
saxicolalis, Mn.
desertalis, Hb.
**serratalis*, Stgr.
**manglisalis*, Ersch.
orientalis, Ev.
umbrosalis, F. R.
Pechi, Baker; *renatalis*, Oberth.
frumentalis, L.
**allardalis*, Oberth.
segetalis, H.-S.
**helenalis*, Stgr.
sophialis, F.
anartalis, Stgr., List XXXIII.

30. Mesographe, *Hb.*

Face slightly rounded, oblique; ocelli distinct: tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated ($\frac{1}{4}$—$\frac{1}{2}$). Labial palpi moderate, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderately long, porrected, triangularly dilated towards apex with loose spreading scales. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 approximated to 9 towards base. Hind wings over 1; veins 4 and 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third.

Allied to *Evergestis*. One species extends from Western Europe to Japan, and a second throughout Africa; the third is also African.

forficalis, L.
africalis, Gn.
**conquisitalis*, Gn.

31. Prochoristis, n. g.

Face slightly rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ stout, filiform, ciliated ($\frac{1}{3}$). Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, triangularly dilated terminally with scales, apex obliquely truncate. Abdomen in ♂ with small anal tuft. Middle tibiæ in ♂ rather dilated, grooved; posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 rather approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at

base, 7 approximated to 6 at base but separate, anastomosing with 8 to one-third.

Apparently allied to *Cybolomia*. The three species are all Asiatic.

rupicapralis, Ld.
capparidis, Christ.
**simplicialis*, Brem. (misprinted *-ealis*).

32. Cybolomia, *Ld.*

Face flat, oblique; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ dentate or filiform, ciliated (½—1). Labial palpi long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderately long, porrected, triangularly dilated with scales. Abdomen in ♂ with small anal tuft. Posterior tibiæ with outer middle-spur one-third, outer end-spur one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

A somewhat aberrant genus, seeming to have relationship to *Evergestis;* the palpi resemble those of the *Crambidæ*, and there is some analogy in other respects. The species range from Southern Europe into Western Asia on the one hand, and South Africa on the other. Guenée's name *Hypolais* is earlier, but is pre-occupied in the birds. The first species is abnormal, and perhaps should not be included.

? *monialis*, Ersch. (♂ not seen).
fractilinealis, Christ.
nemausalis, Dup.
dulcinalis, Tr.
siccalis, Gn.
lutosalis, Mn.
pentadalis, Ld.

33. Hellula, *Gn.*

Face somewhat rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ stout, ciliated (½). Labial palpi moderate, obliquely ascending, second joint with dense rough projecting scales beneath, terminal joint rather short, with acute triangular tuft of scales at apex beneath. Maxillary palpi moderate, porrected, slender, filiform. Abdomen in ♂ with small anal tuft. Posterior tibiæ with outer spurs nearly as long as inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3 and 4

approximated at base, 4 and 5 from a point or stalked, 7 out of 6 near origin, anastomosing with 8 to one-third.

The exact affinity of this genus seems very uncertain. There is only one species, which is now cosmopolitan in warm countries, but I am disposed to think that it has probably been artificially introduced from Europe.

undalis, F.

34. Metasia, *Gn.*

Face with rounded pustule-shaped horny projection; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated ($\frac{1}{2}$—1), sometimes with projecting scales at joints. Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, apex penicillate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to near middle.

A genus of moderate extent, distributed through Southern Europe, the Indo-Malayan region, and Australia. Lederer oddly makes no mention of the frontal protuberance, which is conspicuous.

octogenalis, Ld.
suppandalis, Hb.
**ochrofascialis*, Christ.
carnealis, Tr.
**ossealis*, Stgr.
**mendicalis*, Stgr.
corsicalis, Dup.
ophialis, Tr.
adelalis, Gn.
olbienalis, Gn.

35. Nacoleia, *Walk.*

Face rounded, vertical; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ stout, subdentate or serrate, ciliated ($\frac{1}{3}$—$1\frac{1}{4}$), sharply bent beyond middle, with a tuft of scales on back above bend, sometimes also bent before middle. Labial palpi moderate, porrected or subascending, second joint with short dense projecting scales beneath, terminal joint rather short, stout, exposed. Maxillary palpi short, filiform. Abdomen in ♂ with small anal tuft. Posterior tibiæ with outer middle-spurs one-third, outer end-spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 approximated to 9 towards base. Hind wings slightly over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to near middle.

A rather small genus, ranging through the Indo-Malayan region, Australia, and the Pacific Islands; one species extends into Eastern Siberia. I have given it previously the name of *Semioceros*, but now recognise that Walker's name should be adopted. The genus is one of a small group, all having tufted antennæ in the ♂, and originating probably from *Metasia*.

fenestralis, Christ. (*Agrotera*).

36. Diasemia, *IIb.*

Face rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, ciliated with fascicles (1½—2). Labial palpi moderately long, porrected, second joint with dense projecting scales, terminal joint moderate, exposed, tolerably cylindrical, pointed. Maxillary palpi moderate, porrected, apex loosely penicillate. Abdomen in ♂ with slender anal tuft. Posterior tibiæ with outer spurs one-half to two-thirds of inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third.

A very small but quite cosmopolitan genus, allied to *Metasia*.

litterata, Sc.

ramburialis, Dup.

37. Duponchelia, *Z.*

Face rounded; ocelli distinct; tongue developed. Antennæ three-fourths, in ♂ filiform, shortly ciliated (¼). Labial palpi moderate, ascending, second joint with dense projecting scales beneath, terminal joint rather short, cylindrical, exposed. Maxillary palpi short, apex loosely penicillate. Abdomen in ♂ very long, anal segment elongate, with exsertible genital tuft. Posterior tibiæ with outer middle-spur in ♂ one-fourth, in ♀ one-half inner. Fore wings with an upward-turned ridge of scales from vein 1 near base beneath, 7 from near 8, 9 and 10 out of 8; in ♂ with a naked irregular indentation in cell beneath, and a small indentation between 7 and 8 at base, 2 almost from angle or out of 4, 3 and 4 stalked. Hind wings 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

Allied to *Diasemia;* the single species is South European. Zeller's genus was published in 1847, and

in Scudder's 'Nomenclator' a genus of Diptera, *Duponchelia*, Desv., is dated from the same year; but on application to Mr. G. H. Verrall, he kindly informed me that Desvoidy's genus was published in 1863, Scudder's entry being erroneous.

fovealis, Z.

38. Ischnurges, *Ld.*

Face somewhat rounded; ocelli distinct; tongue developed. Antennæ four-fifths, in ♂ ciliated ($\frac{1}{2}$—1), with angularly projecting scales at joints, or sometimes filiform. Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, filiform, apex penicillate. Abdomen in ♂ long, with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 approximated to 9 at base. Hind wings 1; veins 3, 4, 5 somewhat approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third.

Allied to *Diasemia;* a small genus, ranging from Southern Europe through the Indo-Malayan region to Australia.

bruguieralis, Dup.

diffusalis, Gn.

39. Stenia, *Gn.*

Face somewhat rounded, more or less oblique; ocelli distinct; tongue developed. Antennæ four-fifths to almost one, in ♂ filiform, with projecting scales at apex of joints, ciliated (1). Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, porrected, apex loosely penicillate. Abdomen in ♂ very long, with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 8, 9 and 10 out of 8. Hind wings somewhat over 1 veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

Probably a development from the preceding; apparently characteristic of the European region. *Amaurophanes*, Ld., and *Arnia*, Gn., are included here.

**dissipatalis*, Christ.

**intercacatalis*, Christ.

**amœnialis*, Christ.
stigmosalis, H.-S.
punctalis, Schiff.; *concoloralis*, Oberth.; *? fuscocilialis*, Rag.
nervosalis, Gn.

40. Hydriris, *Meyr.*

Face rounded; ocelli distinct; tongue developed. Antennæ five-sixths, in ♂ ciliated (⅓), with angularly projecting scales at joints. Labial palpi moderate, arched, ascending, second joint with dense projecting scales beneath, terminal joint moderate, with triangular projecting tuft of scales beneath. Maxillary palpi rudimentary. Abdomen in ♂ very long, with small anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings 1; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

Probably allied to *Ischnurges;* a genus of two Indo-Malayan species, of which one ranges very widely, extending over Southern Europe, Africa, and Australia. Lederer's name *Spanista* is preoccupied in the Hymenoptera.

ornatalis, Dup.

41. Antigastra, *Ld.*

Face flat, oblique; ocelli distinct; tongue developed. Antennæ five-sixths, in ♂ ciliated (¼). Labial palpi moderate, porrected, second joint with dense rough projecting scales attenuated to a point forwards, terminal joint concealed. Maxillary palpi moderate, apex loosely penicillate. Abdomen in ♂ with moderate anal tuft. Anterior femora and tibiæ in ♂ clothed with rough projecting hairs on inner side; posterior tibiæ with outer spurs one-half inner; all tarsi very long. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

Allied to *Ischnurges* and *Stenia*. The typical species is Indian, but ranges into Europe; the other is Siberian, and may very likely not belong to the genus.

catalaunalis, Dup.
**virgatalis*, Christ.

42. Nausinoe, *Hb.*

Face flat, oblique; ocelli distinct; tongue developed. Antennæ about one, in ♂ filiform or serrate, ciliated (½—1) or simple. Labial palpi moderate or rather short, subascending, second joint with long dense projecting scales beneath, terminal joint concealed. Maxillary palpi short, thick, apex somewhat penicillate. Abdomen in ♂ with slender anal tuft. Anterior tibiæ and tarsi in ♂ sometimes clothed with long dense hairs; middle tibiæ in ♂ sometimes containing tuft of hairs in groove; posterior tibiæ with outer spurs one-half to four-fifths of inner. Fore wings with veins 2 and 3 in ♂ sometimes stalked from angle of cell, 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings over 1; veins 3, 4, 5 approximated at base, 3 and 4 in ♂ sometimes sinuate so as to enclose a transparent space at base. 7 out of 6 near origin, anastomosing with 8 to one-fourth to two-fifths.

Allied to *Antigastra*, and probably a development from *Ischnurges*. It consists of a few species, scattered generally throughout warmer countries, some of them having an exceedingly wide range. *Phalangiodes*, Gn., *Lepyrodes*, Gn., *Synclera*, Ld., and *Rhimphalea*, Ld., are included here. The following species are without the hairy legs or eccentricities of neuration which are shown by some others :—

traducalis, Z.
**Bleusei*, Oberth.

43. Euclasta, *Ld.*

Face flat, oblique; ocelli distinct; tongue developed. Antennæ over one, in ♂ ciliated (1), with angularly projecting scales at joints. Labial palpi moderate, porrected, with dense projecting scales, narrowed to a point forwards, terminal joint concealed. Maxillary palpi very short, thick, apex loosely penicillate. Abdomen in ♂ long, with moderate anal tuft. Posterior tibiæ with outer spurs about one-third of inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 towards base. Hind wings 1¼; veins 3, 4, 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

Derivable from *Nausinoe;* a small Indo-Malayan genus, extending into Asia Minor and Australia.

splendidalis, H.-S.

44. Hydrocampa, *Latr.*

Face rounded, vertical; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform, towards apex with angularly projecting joints, ciliated ($\frac{2}{3}$). Labial palpi moderate, ascending, second joint with short or moderately long rough projecting scales beneath, terminal joint moderate, pointed or obtuse. Maxillary palpi moderate, subascending, loosely scaled, somewhat pointed. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs three-fourths of inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 closely approximated to 9 near base. Hind wings somewhat over 1; veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-third.

A small European genus; it would seem probable that it originates from the neighbourhood of *Metasia*, but the exact connection is not distinctly traceable. The aquatic habits of this and the following genera are doubtless mainly responsible for their difference in superficial appearance from the rest of the family. Lederer, by an unaccountable error, states vein 10 of the fore wings to rise out of 9, whereas it is by the separation of these veins that the genus is distinguished from the following.

arundinalis, Ev.
nymphæata, L.
rivulalis, Dup.

45. Nymphula, *Schrk.*

Face rounded, vertical; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ filiform or with angularly projecting scales at joints, ciliated ($\frac{1}{3}$—$\frac{3}{4}$). Labial palpi moderate, arched, ascending, second joint with short or moderate projecting scales beneath, terminal joint moderate, obtuse or tolerably pointed. Maxillary palpi moderate or rather short, porrected, apex with loose penicillate scales. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 from near 8, 9 and 10 out of 8. Hind wings 1; veins 3, 4, 5 approximated at base, or 4 and 5 from a point, 7 out of 6 near origin, anastomosing with 8 to one-half to three-fourths.

A development from *Hydrocampa*. It is an Indo-Malayan genus of some extent, but some straggling forms of it seem to occur in all the principal regions.

stagnata, Don.
candidata, F.
stratiotata, L.
**rufoterminalis*, Christ.
**obnubilalis*, Christ.
**vittalis*, Brem.
**algiralis*, Gn.
**thyrididalis*, Ld.

46. Cataclysta, *Hb.*

Face rounded, vertical; ocelli obsolete; tongue developed. Antennæ two-thirds, in ♂ filiform, towards apex with angularly projecting joints, ciliated ($\frac{1}{2}$). Labial palpi moderately long, arched, ascending, second joint with appressed scales or shortly rough-haired beneath, terminal joint moderate, slender, obtuse or pointed. Maxillary palpi short or moderate, filiform. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs three-fourths of inner. Fore wings with vein 7 from near 8, 9 and 10 out of 8. Hind wings 1; veins 3 and 4 approximated at base, 5 approximated or stalked or coincident with 4, 7 out of 6 near origin, anastomosing or wholly coincident with 8.

A development of the preceding; probably especially Indo-Malayan, but every main region seems to possess one or two species.

lemnata, L.

47. Donacaula, n. g.

Face rounded, vertical; ocelli distinct; tongue obsolete. Antennæ in ♂ three-fifths, filiform, ciliated ($1\frac{1}{2}$). Labial palpi very long, porrected, clothed with dense loosely dilated scales, attenuated towards apex, terminal joint moderately long, exposed. Maxillary palpi moderate, triangularly dilated with loose scales. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs two-thirds of inner. Fore wings with vein 7 from near 8, 9 and 10 out of 8, 11 sometimes anastomosing with 12 (sometimes abnormally 8 and 9 out of 10). Hind wings over 1; veins 4 and 5 approximated at base or stalked, 7 out of 6 near origin, anastomosing with 8 to one-third.

A development of *Schœnobius*. The single species is European and West Asiatic.

mucronella, Schiff.

48. Schœnobius, *Dup.*

Face with short conical projecting tuft of scales; ocelli distinct; tongue very short or obsolete. Antennæ in ♂ three-fifths, in ♀ less than one-half, in ♂ filiform, ciliated (1—3). Labial palpi very

long, porrected, clothed with dense loosely dilated scales, attenuated towards apex, terminal joint moderately long, exposed. Maxillary palpi moderate, triangularly dilated with loose scales. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half to four-fifths of inner. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 somewhat approximated to 9 towards base, 11 sometimes anastomosing with 12. Hind wings 1 or over 1 veins 4 and 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to one-fifth to one-third.

A genus of limited extent but cosmopolitan distribution. The resemblance of this genus to *Chilo*, which has usually led to their being classed together, is due to analogy only; as reed-frequenting insects, they have both the form of wings and palpi, and the colouring, which is adapted to concealment in such a situation; the tendency to anastomosis of veins 11 and 12 in the fore wings appears to be a direct consequence of the narrowing and extension of the wings. It is quite certain that *Schœnobius* is truly derivable from *Hydrocampa*, and the intermediate steps are extant in Indian and Australian forms; nor is there here any trace of transition in the structural family characters, such as is shown in *Heliothela*, which approaches the true connecting-link between the families. *Chilo* is simply an aquatic *Crambus*. Although I have not used the ♂ genitalia as systematic characters, they may with advantage be examined in *Hydrocampa*, *Schœnobius*, *Scirpophaga*, and *Acentropus*, by those who doubt their near relationship; they will be found identical in the four genera.

gigantellus, Schiff.
forficellus, Thnb.
Alpherakii, Stgr.

49. Scirpophaga, *Tr.*

Face rounded, vertical; ocelli distinct; tongue very short or obsolete. Antennæ one-third to two-thirds, in ♂ filiform, ciliated (1—2). Labial palpi moderate or rather short, porrected, loosely scaled, terminal joint moderate or short. Maxillary palpi moderate, porrected, apex somewhat dilated with penicillate scales. Thorax in ♂ with patagia forming a rough erectly spreading tuft of hairs; abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half to four-fifths of inner. Fore wings with

vein 7 from near 9, 8 and 9 stalked, 10 tolerably remote, 11 sometimes anastomosing with 12. Hind wings 1 or over 1; veins 4 and 5 somewhat approximated at base, 7 closely approximated to or out of 6 near origin, anastomosing with 8 to one-fifth to one-third.

Very closely allied to the preceding, and equally cosmopolitan.

prælata, Sc.
cinerea, Tr.

50. Acentropus, *Curt.*

Face rounded, vertical; ocelli distinct; tongue absent. Antennæ two-thirds, in ♂ filiform, ciliated (½). Labial palpi moderately long, porrected, dilated with rough projecting scales towards apex. Maxillary palpi very short, loosely scaled. Abdomen in ♂ without anal tuft. Posterior tibiæ with all spurs short and slender. Fore wings with vein 7 from near 9, 8 and 9 stalked, 10 tolerably remote. Hind wings 1; veins 4 and 5 approximated at base, 7 out of 6 near origin (but very faint and nearly obsolete at origin), anastomosing with 8 to beyond middle. Wings in ♀ sometimes much abbreviated or aborted.

Certainly a development of the preceding, from which it differs but little; a very small genus, characteristic of Europe, but possibly overlooked elsewhere. I do not know why there should ever have been any doubt about its position if structure is attended to, as it is perfectly clear. The statement that the tibiæ have no spurs, originally implied by Curtis's generic name, and repeated by Heinemann and others, is perhaps responsible; but it is quite erroneous, as they are distinctly developed, although very slender. I am not quite certain about the common origin of veins 6 and 7 of hind wings, as these veins become so very faint towards their base as to be hardly traceable, but the point cannot be of much importance here, as in *Scirpophaga* both forms are found sometimes in the same species.

niveus, Ol.; *Garnonsii*, Curt.; *Hansoni*, Stph.
latipennis, Möschl.
newæ, Kol.

2. MUSOTIMIDÆ.

Ocelli distinct or obsolete. Tongue well-developed. Maxillary palpi well-developed. Fore wings with vein 7 out of 8 or separate, 8 and 9 stalked. Hind wings without defined pecten of

hairs on lower margin of cell, 3 and 4 from a point or separate, 4 and 5 tolerably remote, 6 from angle of cell, 7 from upper margin of cell before 6 or rarely out of 6 near origin, anastomosing from 8.

This little family is characteristic of the coasts of the Western Pacific from Japan to New Zealand, but one species reaches as far back as Ceylon. It contains at present only three genera, and seems to be the remnant of a more extensive group, related by collateral development to the *Pyralididæ*.

51. Musotima, *Meyr.*

Face somewhat rounded, vertical; ocelli distinct; tongue well-developed. Antennæ two-thirds, in ♂ stout, subdentate, ciliated ($\frac{1}{2}$). Labial palpi moderately long, porrected or subascending, second joint with projecting scales beneath, terminal joint exposed, with rough scales beneath towards apex. Maxillary palpi moderate, dilated with rough scales, truncate. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with all spurs nearly equal. Fore wings with vein 7 separate, 9 and 10 rising out of 8, 11 short. Hind wings over 1; veins 3, 4, 5 remote, 6 from angle, 7 from considerably before angle, anastomosing with 8 from near origin to one-third.

A small genus, at present known from Ceylon, Australia, and New Zealand. Unfortunately I am not acquainted with the following East Siberian species, referred by Bremer to *Hydrocampa;* but his figure shows so much superficial resemblance to the typical species of this genus, that I venture to place it here provisionally; someone who possesses the insect will perhaps compare it with the characters given above.

**colonalis*, Brem.

3. PYRALIDIDÆ.

Ocelli present, often concealed by scales. Tongue well-developed, or sometimes obsolete. Maxillary palpi well-developed, or rarely rudimentary. Fore wings with vein 1 usually shortly or obscurely furcate at base, sometimes simple, 4 and 5 closely approximated at base or often stalked, 7 and 8 out of 9. Hind wings without defined pecten of hairs on lower margin of cell, veins 4 and 5 closely approximated at base or from a point or stalked, 7 out of 6 near origin or rarely separate but closely approximated, free or sometimes anastomosing with 8.

The earliest form of the family is the group of *Stericta*, formerly separated by me as a distinct family under the name of *Epipaschiadæ*, but I now recognise that this distinction is not tenable. From this group development has taken place in two principal lines; one through *Mnesixena*, *Synaphe*, *Endotricha* to *Acropentias*, the other through *Pyralis* to *Aglossa*. The family is nearly cosmopolitan, but of no great size; it is, however, unrepresented by indigenous species in New Zealand.

Tabulation of Genera.

1.	Hind wings with vein 8 anastomosing strongly with 7	2.
	Hind wings with vein 8 free or anastomosing extremely shortly	4.
2.	Fore wings with vein 10 out of 8	52. Acropentias.
	Fore wings with vein 10 rising separate	3.
3.	Thorax in ♂ with patagia very long, ending in long tuft of hairs	53. Endotricha.
	Thorax in ♂ with patagia normal	56. Lepidogma.
4.	Antennæ in ♂ bipectinated..	5.
	Antennæ in ♂ ciliated	8.
5.	Posterior tibiæ in ♂ with tuft of scales on basal joint	61. Xestula.
	Posterior tibiæ in ♂ without tuft	6.
6.	Basal joint of antennæ large, dilated with scales	55. Mnesixena.
	Basal joint of antennæ normal	7.
7.	Tongue obsolete	63. Aglossa.
	Tongue developed	54. Synaphe.
8.	Basal joint of antennæ in ♂ with horny projection	9.
	Basal joint of antennæ without horny projection	10.
9.	Crown in ♂ with long reflexed tuft of hairs ..	60. Craneophora.
	Crown in ♂ without reflexed tuft	59. Stericta.
10.	Basal joint of antennæ with projection of scales	11.
	Basal joint of antennæ without projection ..	62. Pyralis.
11.	Hind wings with vein 7 out of 6	58. Ulotricha.
	Hind wings with vein 7 rising separate	57. Hypotia.

52. Acropentias, n. g.

Face rounded; ocelli distinct; tongue short. Antennæ two-thirds, in ♂ dentate, ciliated (1). Labial palpi moderately long, subascending, second joint with long dense projecting scales beneath, forming an angular tuft at apex, terminal joint moderate, exposed, pointed. Maxillary palpi moderate, triangularly dilated

with dense scales. Abdomen in ♂ with small anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 3 from considerably before angle, 4 and 5 stalked from angle, 7 out of 8 near base, 9, 10, and 11 out of 8. Hind wings 1; veins 4 and 5 stalked, 7 out of 6 near origin, anastomosing with 8 to middle.

This curious genus includes only one East Siberian species.

obtusalis, Christ. (*Sparagmia*).

53. Endotricha, *Z.*

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ ciliated or finely bipectinated, pectinations ending in tufts of cilia. Labial palpi moderate, ascending, second joint with rough projecting scales beneath, terminal joint short, exposed. Maxillary palpi very short, slender, or rudimentary. Thorax in ♂ with patagia much elongated, terminating in long tuft of hairs. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-third to one-half of inner. Fore wings with veins 4 and 5 from a point or stalked, 7 and 8 out of 9, 10 rather approximated to 9 towards base. Hind wings over 1; veins 4 and 5 from a point or stalked, 7 out of 6 near origin, anastomosing with 8 to one-third.

An Indo-Malayan genus of moderate size, ranging thence into Australia, Eastern Asia, and Africa, and one species reaching Europe.

flammealis, Schiff.
icelalis, Walk. (*icclusalis*); *flavofascialis*, Brem.
**costimaculalis*, Christ. (*costæmaculalis*).
**olivacealis*, Brem.
**penicillalis*, Christ.

54. Synaphe, *Hb.*

Face rounded, sometimes with projecting scales; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ bipectinated, pectinations slender, often terminating in fascicles of cilia. Labial palpi very long, porrected, clothed with loose scales or sometimes with rough projecting hairs, attenuated forwards, terminal joint long, exposed. Maxillary palpi moderately long, more or less triangularly dilated with scales. Abdomen in ♂ with moderate anal tuft. Femora and tibiæ sometimes hairy; posterior tibiæ with outer spurs one-half to two-thirds of inner. Fore wings with vein 6 sometimes out of 9, 7 and 8 out of 9, 10 closely approximated to 9 towards base. Hind wings over 1; veins 4 and 5

approximated at base or stalked, 7 out of 6 near origin, approximated shortly to 8, or connected with it at a point only.

Characteristic of the European and Central Asiatic regions. It is by error that Lederer states the antennæ to be sometimes ciliated; they are pectinated in all species, but the pectinations are sometimes very slender. Both forms of the structure of vein 8 of the hind wings sometimes occur in the same species, though connection is much rarer.

pertusalis, Hb.
uxorialis, Ld.
bombycalis, Schiff.; *consessoralis*, Ersch.
moldavica, Esp.
consecratalis, Ld.
connectalis, Hb.
morbidalis, Gn.
interjunctalis, Gn.
isthmicalis, Ld.
**infumatalis*, Ersch.
armenialis, Ld.
**oculatalis*, Rag.
angustalis, Schiff.
brunnealis, Tr.
honestalis, Tr.
borgialis, Dup.

55. Mnesixena, n. g.

Face rounded, with slightly projecting scales; ocelli distinct; tongue short. Antennæ two-thirds, in ♂ bipectinated, basal joint large, dilated with scales, often with a small concealed horny projection on upper side. Labial palpi very long, porrected, with loose rough scales, attenuated forwards, terminal joint moderate. Maxillary palpi moderate, dilated with loose rough scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with spurs all long and nearly equal. Fore wings with veins 7 and 8 out of 9, or 8 and 9 out of 7, 10 rather approximated to 7 at base. Hind wings over 1; veins 4 and 5 stalked or separate, 7 out of 6 near origin, approximated shortly to 8.

A small genus, characteristic of Western Asia and the shores of the Mediterranean.

pectinalis, H.-S.
colchicalis, H.-S.
massilialis, Dup.
speciosalis, Christ.
**cribellalis*, Ersch.
**russulalis*, Christ.
concatenalis, Ld.

56. Lepidogma, n. g.

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ dentate, ciliated with fascicles, basal joint with very large apical projection of scales. Labial palpi moderately

long, subascending, second joint loosely scaled, terminal joint moderately long. Maxillary palpi rather short, dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with veins 4 and 5 from a point, 6 sometimes out of 9, 7 and 8 out of 9, 10 and 11 sometimes anastomosing shortly. Hind wings over 1; veins 4 and 5 approximated at base, 7 out of 6 near origin, anastomosing with 8 to two-fifths.

A development of the preceding, containing only one species from Western Asia and the Mediterranean.

tamaricialis, Mn.; *? obatralis*, Christ.

57. Hypotia, *Z.*

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ dentate, ciliated with fascicles, basal joint large, with apical projection of scales. Labial palpi moderately long, porrected, second joint with apical projecting tuft of scales beneath, terminal joint moderate, exposed. Maxillary palpi moderate, dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with veins 7 and 8 out of 9, 10 approximated to 9 at base. Hind wings over 1; veins 4 and 5 approximated at base, 7 from very near 6, approximated shortly to 8.

Allied to *Mnesixena;* attached to the shores of the Mediterranean.

corticalis, Schiff.
**proximalis*, Christ.
**infulalis*, Ld.

58. Ulotricha, *Ld.*

Face rounded; ocelli distinct; tongue short. Antennæ two-thirds, in ♂ subdentate, ciliated with long fascicles (3), basal joint with projection of scales in front. Labial palpi moderate, subascending, second joint shortly rough-scaled beneath, terminal joint moderate, exposed. Maxillary palpi rudimentary. Abdomen in ♂ with moderate anal tuft. Middle tibiæ dilated with rough scales; posterior tibiæ with outer spurs two-thirds of inner. Fore wings with veins 4 and 5 from a point, 8 and 9 out of 7, 10 from near 7. Hind wings over 1; veins 4 and 5 stalked, 7 out of 6 near origin, approximated shortly to 8.

Nearly allied to *Hypotia;* it contains one Mediterranean species.

egregialis, H.-S.

59. Stericta, *Ld.*

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ ciliated, basal joint with a long densely scaled erect or reflexed horny process. Labial palpi moderately long, curved, ascending, second joint with appressed scales, sometimes expanded at apex, terminal joint rather short, pointed. Maxillary palpi rather short, filiform, in ♂ terminating in a long pencil of hairs. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with veins 4 and 5 approximated or from a point or stalked, 7 and 8 out of 9, 10 approximated to 9 towards base. Hind wings over 1; veins 4 and 5 approximated or from a point or stalked, 7 out of 6 near origin, approximated shortly to 8 or rarely connected at a point or very shortly anastomosing.

A genus of moderate size, principally developed in the Indo-Malayan region and Australia, but also found in North America; the position of the following East Siberian species cannot be assured in the absence of the ♂, but is almost certain.

inimica, Butl.; *amurensis*, Stgr. MS. (*Aglossa*).

60. Craneophora, *Christ.*

Face rounded, crown in ♂ with long recurved tuft of hairs ocelli concealed (?); tongue developed. Antennæ two-thirds, in ♂ filiform, ciliated, basal joint with a short horny projection in front. Labial palpi rather long, curved, ascending, second joint with dense appressed scales (said to have a tuft of hairs in ♂, probably in error). Maxillary palpi (said to be absent, but probably) filiform, in ♂ terminating in a long pencil of hairs. Posterior tibiæ with outer spurs one-half inner. Fore wings with veins 7 and 8 out of 9. Hind wings with veins 4 and 5 approximated at base, 7 out of 6 near origin, approximated shortly to 8.

Apparently closely allied to the preceding, and containing one East Siberian species. I have not been able to see it, and the above generic characters are taken from Christoph, but whether they are trustworthy is very doubtful. I have ventured to make one conjectural correction; the tuft of yellowish hairs said to be attached to the labial palpi of the ♂ is probably the maxillary palpi, which are said to be absent, but probably lie concealed between the labial, as in the preceding genus.

One of the veins of the fore wing (10 or 11) is not alluded to by Christoph, but is probably overlooked.

**Ficki*, Christ.

61. Xestula, *Snell.*

Face somewhat rounded, oblique, with somewhat projecting scales; ocelli distinct; tongue developed. Antennæ one-half, in ♂ bipectinated, towards apex simple, basal joint with apical projection of scales in front. Labial palpi moderate, porrected, second joint with rough projecting scales beneath towards apex, terminal joint short, concealed. Maxillary palpi rather short, dilated with loose scales towards apex. Thorax in ♂ with very large expansible pencil of hairs from shoulders beneath. Abdomen in ♂ with moderate anal tuft, and apical lateral pencils of scales. Posterior tibiæ in ♂ with rough projecting scales, outer spurs one-half inner, posterior tarsi in ♂ with tuft of scales at apex of basal joint above (anterior and middle legs broken). Fore wings with vein 1 with long basal furcation, 4 and 5 closely approximated towards base, 7 and 8 out of 9, 10 approximated to 9 towards base. Hind wings over 1; veins 4 and 5 from a point, 7 out of 6 near origin, approximated shortly to 8.

Intermediate between the preceding group and *Pyralis*; it includes only the following East Siberian species.

miraculosa, Snell.

62. Pyralis, *L.*

Face rounded, with rather projecting scales; ocelli distinct or concealed; tongue developed. Antennæ two-thirds, in ♂ filiform, serrulate, or dentate, ciliated (1—2). Labial palpi moderately long, porrected or ascending, second joint with appressed or rough projecting scales, terminal joint moderate or short, exposed. Maxillary palpi short or moderate, tolerably filiform or apex dilated with loose penicillate scales. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with veins 4 and 5 from a point or stalked, 7 and 8 out of 9, 10 rather approximated to 9 towards base. Hind wings over 1; veins 4 and 5 from a point or stalked, 7 out of 6 near origin, approximated shortly to 8.

A cosmopolitan genus, but some of the species owe their wide range to artificial introduction. I have here included *Stemmatophora*, Gn.; it is supposed to be distinguished from *Pyralis* by the presence of ocelli, but I

find them to be present in all species alike, though in some more exposed and conspicuous. *P. pictalis*, Curt., which I have not mentioned in the list of species, is excluded as an exotic, only inserted in the European lists by an error of habitat, or perhaps an accidental and purely temporary introduction.

rubidalis, Schiff.
fulvocilialis, Dup.
**incarnatalis*, Z.
glaucinalis, L.
costalis, F.
regalis, Schiff.
lienigialis, Z.
farinalis, L.; *domesticalis*, Z. (cert.).
**fuscolimbalis*, Rag.
**leonalis*, Oberth.
combustalis, F. R.
subustalis, Ld.
**gadesialis*, Rag.
perversalis, H.-S.
obsoletalis, Mn.

63. Aglossa, *Latr.*

Face rounded; ocelli distinct or concealed; tongue obsolete. Antennæ two-thirds, in ♂ bipectinated, pectinations slender. Labial palpi moderately long, porrected or subascending, second joint with dense rough projecting scales beneath, terminal joint moderate, exposed. Maxillary palpi moderate, apex with loose penicillate scales. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with veins 4 and 5 from a point or stalked, 7 and 8 out of 9, 10 approximated to 9 towards base. Hind wings over 1; veins 4 and 5 stalked, 7 out of 6 near origin, approximated shortly to 8.

Now nearly cosmopolitan, but probably by artificial introduction. The antennæ of the ♂ are always said to be ciliated, but are really bipectinated, the pectinations being very fine, as in some species of *Synaphe*.

pinguinalis, L.
cuprealis, Hb.
**exsucealis*, Ld.
**signicostalis*, Stgr.

4. PHYCITIDÆ.

Ocelli distinct or rarely concealed. Tongue well-developed or rudimentary. Maxillary palpi well-developed or rudimentary, not triangular. Fore wings with vein 1 simple, or obsoletely furcate, 4 and 5 closely approximated at base or stalked, 7 absent (coincident with 8), 8 and 9 stalked. Hind wings with defined pecten of hairs on lower margin of cell, veins 4 and 5 closely approximated at base or stalked or coincident, 7 out of 6 near origin, anastomosing with 8 or free.

This family is an early offshoot of the immediate ancestors of the *Pyralididæ*. It is cosmopolitan, but especially attached to warm countries. As mentioned above, in courtesy to M. Ragonot, I do not propose to enter into the classification of this and the following family until his monograph is published.

5. GALLERIADÆ.

Ocelli distinct or concealed. Tongue well-developed or obsolete. Maxillary palpi more or less developed, not triangular. Fore wings with vein 1 usually furcate at base, 4 and 5 closely approximated at base or stalked, 7 rising out of 8, 8 and 9 stalked. Hind wings with defined pecten of hairs on lower margin of cell, veins 4 and 5 closely approximated at base or stalked or coincident, 7 out of 6 near origin, anastomosing with 8 or free.

A small family, but nearly cosmopolitan. Like the preceding, it is an early development from the ancestors of the *Pyralididæ*.

6. CRAMBIDÆ.

Ocelli distinct or concealed, or rarely obsolete. Tongue well-developed, or rarely obsolete. Labial palpi long, straight, porrected. Maxillary palpi well-developed, strongly triangularly dilated with scales. Fore wings with vein 1 simple or obsoletely furcate, 4 and 5 closely approximated at base or stalked, 7 separate or out of 8, 8 and 9 stalked or rarely coincident. Hind wings with defined pecten of hairs on lower margin of cell, veins 4 and 5 from a point or stalked or coincident or rarely only approximated at base, 7 out of 6 near origin or approximated or widely remote, anastomosing with 8 or very rarely free.

A family of considerable size and universal distribution. The earliest existing form is probably *Diptychophora*, which shows the aboriginal character of a well-marked separation at origin of veins 4 and 5 of the hind wings; from this there are two lines of descent, one through *Talis* to *Ancylolomia*, now represented by very few species except in Australia, where *Talis* is dominant, and the other through *Euchromius* to *Crambus*. The uniformity of the palpi in this family is very remarkable.

Tabulation of Genera.

1.	Fore wings with vein 7 rising out of 8	2.
	Fore wings with vein 7 separate	4.
2.	Hind wings with vein 7 rising out of 6	3.
	Hind wings with vein 7 widely remote	64. Ancylolomia.
3.	Ocelli concealed	71. Calamotropha.
	Ocelli exposed, distinct	70. Crambus.
4.	Hind wings with veins 4 and 5 separate at origin	66. Diptychophora.
	Hind wings with veins 4 and 5 from a point or stalked	5.
5.	Hind wings with vein 7 out of 6 or rarely closely approximated	6.
	Hind wings with vein 7 widely remote from 6 ..	65. Talis.
6.	Fore wings in ♂ with semitransparent patch in cell..	67. Euchromius.
	Fore wings in ♂ without semitransparent patch	7.
7.	Face with conical horny projection	68. Chilo.
	Face without projection	69. Platytes.

64. Ancylolomia, *Hb.*

Face rounded; ocelli distinct; tongue obsolete. Antennæ two-thirds, in ♂ flattened-dentate, ciliated ($\frac{1}{4}$), or unipectinated. Labial palpi long, porrected, clothed with loose rough scales, attenuated forwards. Maxillary palpi moderate, triangularly dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half to two-thirds of inner. Fore wings with veins 7 and 8 out of 9, 10 rather approximated to 9 towards base, 11 running into 12. Hind wings $1\frac{1}{4}$; veins 4 and 5 closely approximated or stalked, 7 remote from 6, anastomosing very shortly with 8.

A small genus, ranging over South Europe, the Indo-Malayan region, and Africa.

contritella, Z.
tentaculella, Hb.
pectinatella, Z.
**inornata*, Stgr.
palpella, Schiff.

65. Talis, *Gn.*

Face with horny projection; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ dentate, ciliated or bipectinated. Labial palpi long, porrected, dilated with loose rough scales, attenuated forwards. Maxillary palpi moderate, triangularly dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft.

Posterior tibiæ with outer spurs one-half inner. Fore wings with veins 4 and 5 separate or stalked, 7 separate, 8 and 9 stalked, 10 tolerably remote, 11 sometimes bent. Hind wings $1\frac{1}{4}$—$1\frac{1}{2}$; veins 4 and 5 from a point, stalked, or rarely coincident, 7 remote from 6, anastomosing more or less with 8, rarely with inner margin in ♂ lobed and furnished with hair-pencil.

Perhaps not yet sufficiently recognised; it is well-developed and dominant in Australia, where it takes the place of *Crambus;* stragglers are found in New Zealand, the Hawaiian Islands, Central Asia, and Europe. *Hednota*, Meyr., is a synonym.

pulcherrima, Stgr.
quercella, Schiff.
**arenella*, Rag.
**subscissa*, Christ.

66. Diptychophora, *Z.*

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ shortly ciliated. Labial palpi moderately long, porrected, dilated with loose rough scales, attenuated forwards. Maxillary palpi moderate, triangularly dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 separate, 8 and 9 stalked, 10 tolerably remote, 11 running into 12 or free, but bent so as to be closely approximated to 12. Hind wings $1\frac{1}{4}$; vein 4 from a point with 3 or absent (coincident), 5 more or less remote at origin from 4, 7 remote from 6 at origin, anastomosing with 8 to one-third.

Whether the following species is truly referable here, I cannot certainly state, but it seems not unlikely. The genus is well-developed in New Zealand, and species occur in Australia and South America; the subjoined species is Asiatic.

**exsectella*, Christ.

67. Euchromius, *Gn.*

Face with conical horny projection; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ serrate, ciliated ($\frac{1}{2}$). Labial palpi long, porrected, clothed with loose scales, attenuated forwards. Maxillary palpi moderate, triangularly dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half inner. Fore wings with vein 7 separate, 8 and 9 stalked, 10 more or less remote, in ♂ with a

semitransparent patch in cell towards base. Hind wings 1¼; veins 4 and 5 stalked, 7 out of 6 near origin, anastomosing with 8 to near middle.

A small genus characteristic of the coasts of the Mediterranean, but one species has now spread very widely in other regions, probably, as I have explained elsewhere, by artificial introduction. Hübner's name *Eromene*, commonly used for this genus, cannot stand, as Hübner himself used the same name for a genus of *Noctuina* (=*Thalpochares*, Ld., which it supersedes) earlier in the same volume.

bellus, Hb.
zonellus, Z.
wockeellus, Z.
ramburiellus, Z.
superbellus, Z.
anapiellus, Z.
vinculellus, Z.
ocelleus, Hw.
**latus*, Stgr.
**jaxartellus*, Ersch.
**pulverosus*, Roman.

68. Chilo, *Zk.*

Face with conical horny projection; ocelli distinct or concealed; tongue short. Antennæ two-thirds, in ♂ subdentate, ciliated (½). Labial palpi very long, porrected, clothed with loose rough scales, attenuated forwards. Maxillary palpi moderately long, porrected, triangularly dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs three-fourths of inner. Fore wings with vein 7 from near 8, 8 and 9 stalked, 10 approximated to 9 towards base, 11 bent. Hind wings 1¼; veins 4 and 5 from a point or stalked, 7 closely approximated to or from a point with 6, anastomosing with 8 to about middle.

A small genus of pretty general distribution.

phragmitellus, Hb.
cicatricellus, Hb.

69. Platytes, *Gn.*

Face rounded; ocelli distinct; tongue developed. Antennæ two-thirds, in ♂ subdentate, ciliated (½). Labial palpi very long, porrected, clothed with loose rough scales, attenuated forwards. Maxillary palpi moderately long, triangularly dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs two-thirds to three-fourths of inner. Fore wings with vein 7 from near 8, 8 and 9 stalked or sometimes coincident, 10 remote. Hind wings 1¼; veins 4 and 5 stalked or coincident, 7 out of 6 near origin, anastomosing with 8 to beyond middle.

Whether any species outside the European fauna are justly referable here is perhaps as yet not clearly ascertained.

alpinella, Hb.
carectella, Z.
**pallidella*, Dup.
**lugdunella*, Mill.
cerussella, Schiff.

70. Crambus, *F.*

Face rounded, sometimes more or less prominent or forming a pointed horny cone; ocelli exposed, distinct; tongue developed. Antennæ two-thirds, in ♂ dentate or filiform, ciliated ($\frac{1}{3}$—1) or rarely shortly bipectinated. Labial palpi very long, porrected, clothed with loose rough scales, attenuated forwards. Maxillary palpi moderately long, triangularly dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs one-half to two-thirds of inner. Fore wings with veins 4 and 5 separate, from a point, or stalked, 7 and 8 out of 9, or 8 sometimes absent (coincident), 10 approximated to 9 towards base or sometimes out of 9 near base, 11 rather bent, sometimes connected with 12 at a point. Hind wings about $1\frac{1}{2}$; veins 4 and 5 from a point or stalked, 7 out of 6 near origin, anastomosing with 8 to about middle, or rarely shortly only.

Probably the largest genus of the whole group, being plentifully represented in all regions except Australia, where there are no indigenous species, and the Indo-Malayan region, where there are comparatively few. Although showing considerable variation in structure, it will certainly not admit of subdivision. In the frontal structure every transitional form occurs, and it is impossible to draw a line; transitional forms between the dentate and pectinated antennæ are also found, as in *Talis*; and the various differences in neural structure are all found in different specimens of the same species.

candiellus, H.-S.
malacellus, Dup.; *hapaliscus*, Z.; *concinnellus*, Walk.
argyrophorus, Butl.
hamellus, Thnb.
argentarius, Stgr.
uliginosellus, Z.
pascuellus, L.
cricellus, Hb.
silvellus, Hb.
splendidellus, Christ.
dumetellus, Hb.
**nemorellus*, Hb.
palustrellus, Rag. (? = præc.)

pratellus, L.
alienellus, Zk.
heringiellus, H.-S.
Kobelti, Saalm.
textellus, Christ.
culmellus, L.
hortuellus, Hb.
lucellus, H.-S.
craterellus, Sc.
chrysonuchellus, Sc.
biarmicus, Tgst.
maculalis, Zett.
truncatellus, Zett.
trichostomus, Christ.
mandschuricus, Christ.
vigens, Butl.; *fucatellus*, Christ.
falsellus, Schiff.
verellus, Zk.
incertellus, H.-S.
confusellus, Stgr.
**Staudingeri*, Z.
corsicellus, Dup.
dimorphellus, Stgr.
luctiferellus, Hb.
**permutatellus*, H.-S.
speculalis, Hb.
myellus, Hb.
**colchicellus*, Ld.
mytilellus, Hb.
pinellus, L.
conchellus, Schiff.
pauperellus, Tr.
pyramidellus, Tr.
margaritellus, Hb.
furcatellus, Zett.
radiellus, Hb.
monotæniellus, H.-S.
**vectifer*, Z.
latistrius, Hw.
fulgidellus, Hb.
saxonellus, Zk.
aureliellus, F. R.; *immaturellus*, Christ.
**delicatellus*, Z.
perlellus, Sc.; *rostellus*, Lah.; *languidellus*, Z.
lævigatellus, Ld.
zermattensis, Frey.
combinellus, Schiff.
**petrificellus*, Dup.
coulonellus, Dup.
**orientellus*, H.-S.
subflavellus, Dup.
**Kindermanni*, Z.
spuriellus, Hb.
digitellus, H.-S.
pudibundellus, H.-S.
fascelinellus, Hb.; *jucundellus*, H.-S.; *ramosellus*, Z.
acutangulellus, H.-S.
**italellus*, Cost.
**cyrenaicellus*, Rag.
**profluxellus*, Roman.
**paleatellus*, Z.
trabeatellus, H.-S.
inquinatellus, Schiff.
siculellus, Dup.
**tersellus*, Ld.
desertellus, Ld.
geniculeus, Hw.
salinellus, Tutt.
contaminellus, Hb.
matricellus, Tr.
poliellus, Tr.
deliellus, Hb.
lithargyrellus, Hb.
ossellus, Stgr., List XXXIII.
tristellus, F.
selasellus, Hb.
**æneociliellus*, Ev.
luteellus, Schiff.

71. Calamotropha, *Z.*

Face with short prominence; ocelli present, concealed; tongue developed. Antennæ two-thirds, in ♂ ciliated. Labial palpi very long, porrected, clothed with loose rough scales, attenuated forwards. Maxillary palpi moderately long, triangularly dilated with scales towards apex. Abdomen in ♂ with moderate anal tuft. Posterior tibiæ with outer spurs two-thirds of inner. Fore wings with veins 4 and 5 separate, 7 and 8 out of 9, 10 approximated to 9 towards base. Hind wings about $1\frac{1}{3}$; veins 4 and 5 from a point, 7 out of 6 near origin, anastomosing with 8 to about middle.

This genus is only separable from *Crambus* by the ocelli, which are completely concealed by scales, whereas in *Crambus* they are always clear, exposed, and conspicuous. This seems sufficient under the circumstances. The genus contains only a few widely scattered species.

paludella, Hb.
**hierochuntica*, Z.

7. PTEROPHORIDÆ.

Ocelli usually concealed or obsolete, rarely distinct. Tongue well-developed. Maxillary palpi obsolete. Fore wings with vein 1 simple or shortly furcate, 5 remote from 4, 7 separate or out of 8 or absent, 8 and 9 stalked or coincident or rarely separate (*Agdistis*), 10 and 11 sometimes out of 9 or absent, wing usually fissured, forming two or rarely three or four segments. Hind wings without defined pecten of hairs on lower margin of cell, vein 5 remote from 4, vein 7 remote from 6, approximated shortly to 8 beyond origin, wing usually fissured, forming three segments.

This family, which is of considerable size and cosmopolitan, appears to be of very early origin. The Australian family *Oxychirotidæ*, which probably consists of the remnants of a collateral branch of development, supplies forms quite intermediate in character between the *Pterophoridæ* and other *Pyralidina*, including species with ordinary entire triangular wings, with absolutely linear wings, and with wings divided each into two segments. I have formerly stated the *Pterophoridæ* to possess no ocelli, but I now find that they are present in some of the earliest forms, as *Agdistis*, though usually obsolete. The exceptional separation of veins 8 and 9 of the fore wings is referred to under *Agdistis*. All the species of this family show a more or less developed

double row of short spine-like dark scales on lower margin of cell in disc beneath. The development of the family has proceeded on two lines, the ancestral form being near to *Agdistis;* one line being by way of *Platyptilia* and *Oxyptilus* to *Trichoptilus*, the other through *Stenoptilia*, *Alucita*, and *Crasimetis* to *Pterophorus*. The extreme genera of both lines have the neuration much degraded.

Tabulation of Genera.

1.	Wings entire	75. Agdistis.
	Wings fissured	2.
2.	Hind wings with more or less developed tooth of black scales in dorsal cilia	3.
	Hind wings without black scales in dorsal cilia	5.
3.	Fore wings with veins 7 and 9 absent	72. Trichoptilus.
	Fore wings with veins 7 and 9 present.. ..	4.
4.	Fore wings with vein 10 rising out of 8 ..	73. Oxyptilus.
	Fore wings with vein 10 separate	74. Platyptilia.
5.	Fore wings with all veins present	76. Stenoptilia.
	Fore wings with one or more veins absent ..	6.
6.	Fore wings with vein 10 separate	7.
	Fore wings with vein 10 out of 8 or absent ..	8.
7.	Fore wings with vein 7 out of 8	79. Gypsochares.
	Fore wings with vein 7 separate	77. Alucita.
8.	Fore wings with veins 3 and 7 absent	81. Pterophorus.
	Fore wings with veins 3 and 7 present ..	9.
9.	Fore wings with vein 11 out of 8	80. Crasimetis.
	Fore wings with vein 11 separate	78. Marasmarcha.

72. Trichoptilus, *Wlsm.*

Face without tuft, rounded; ocelli obsolete; tongue developed. Antennæ two-thirds, in ♂ ciliated ($\frac{1}{3}$—$\frac{2}{3}$). Labial palpi moderate, ascending, second joint with short projecting scales beneath, tending to form a short angular apical tuft, terminal joint short or long, filiform, tolerably pointed. Maxillary palpi obsolete. Tibiæ thickened with scales on origin of spurs, outer spurs nearly equal inner. Fore wings bifid, cleft from before middle; vein 2 out of 4 or absent, 3 absent, 5 and 6 extremely short, 7 absent, 9 absent, 10 from near 8 or absent, 11 from near 8, long. Hind wings trifid, third segment with more or less developed tooth of black scales in dorsal cilia, often slight; vein 2 from middle of cell, 3 absent, 5 and 6 very short, 7 to apex.

A genus of limited extent, but cosmopolitan; more species are known from Australia than any other region.

siceliota, Z.
paludum, Z.

73. Oxyptilus, *Z.*

Face rounded, smooth or with small tuft; ocelli obsolete; tongue developed. Antennæ two-thirds, in ♂ filiform, simple or ciliated ($\frac{1}{4}$—$\frac{1}{2}$). Labial palpi moderate, ascending, second joint with appressed or projecting scales beneath, sometimes forming a short angular apical tuft, terminal joint moderate, filiform, tolerably acute. Maxillary palpi obsolete. Tibiæ thickened with scales on origin of spurs, outer spurs nearly equal inner. Fore wings bifid, cleft from about middle; vein 2 from a point with 4, 3 and 4 stalked, 5 and 6 very short, 7 from below 8, long, 9 and 10 out of 8, 11 from near 8. Hind wings trifid, third segment with a well-developed tooth of black scales in dorsal cilia; vein 2 from middle of cell, 3 from near angle, very short, 5 and 6 very short, 7 to apex.

This genus is especially characteristic of Europe, but stragglers have spread thence into the surrounding regions.

lætus, Z.
distans, Z.
tristis, Z.
Kollari, Stt.
pilosellæ, Z.
Hofmannseggii, Möschl.
parvidactylus, Hw.
**Bohemanni*, Wallgr.
marginellus, Z.
ericetorum, Z.
**maculatus*, Const.
hieracii, Z.
teucrii, Greening.
didactylus, L.; ? *brunneodactylus*, Mill.

74. Platyptilia, *Hb.*

Face with projecting tuft of scales, rarely absent; ocelli obsolete; tongue developed. Antennæ two-thirds, in ♂ ciliated ($\frac{1}{4}$—1). Labial palpi rather long, obliquely ascending, second joint loosely scaled, terminal joint moderate, porrected, filiform. Maxillary palpi obsolete. Tibiæ simple or somewhat tufted on origin of spurs and centre of middle tibiæ, outer spurs nearly equal inner. Fore wings bifid, cleft from two-thirds to three-fourths; vein 2 from much before angle, 3 from near angle, 5 and 6 short, 7 from below 8, 8 and 9 stalked, 10 from near 9, 11 remote. Hind wings trifid, third segment with well-developed tooth of black scales in dorsal cilia; vein 2 from middle of cell, 3 from near angle, 5 and 6 short, 7 and 8 divergent from beyond cleft.

A genus of considerable size, and quite cosmopolitan.

cosmodactyla, Hb.
acanthodactyla, Hb.
tesseradactyla, L.
farfarella, Z.
gonodactyla, Schiff.
Metzneri, Z.
Zetterstedtti, Z.
similidactyla, Dale.
nemoralis, Z.; *isodactyla*, Z.
Bertrami, Rössl.
ochrodactyla, Hb.
**capnodactyla*, Z.
rhododactyla, F.

75. Agdistis, *Hb.*

Face with more or less developed horny prominence; ocelli distinct; tongue developed. Antennæ four-fifths, in ♂ filiform, shortly ciliated. Labial palpi moderate, ascending, second joint with rough projecting scales beneath, terminal joint short. Maxillary palpi obsolete. Tibiæ simple, outer spurs one-half inner. Fore wings entire; vein 2 from near angle, 3 and 4 approximated or stalked, 5 widely remote from 4, from near middle of transverse vein, 7 from near 8, 8 and 9 stalked, 10 from near 8, or sometimes 8 separate, 9 and 10 stalked, or all three separate. Hind wings entire, on lower margin of cell beneath with a pecten of dense scales in disc, and inner margin roughened beneath with scales; vein 2 from middle of cell, 3 and 4 approximated at base, 5 absent, 6 remote from 7, 8 shortly approximated to 7, posteriorly divergent.

A European genus, extending into Africa. It is small and compact, immediately separable from the whole of the family, and all the species are very similar superficially, but it includes remarkable variations in structure. I believe, however, that these will eventually be connected by transitional forms, and that there is no necessity for generic subdivision, nor have I at present been able to obtain as much material for examination as I could wish. The occasional separation of veins 8 and 9 of the fore wings is only paralleled in this group in the *Siculodidæ*. In the roughened dark scales on the under surface of the inner margin of hind wings may be seen the origin of the black scale-teeth of the preceding genera. The differences in the frontal prominence, which are considerable, are of value in specific distinction.

satanas Mill.
adactyla, Hb.
**manicata*, Stgr.
Heydenii, Z.
meridionalis, Z.
**frankeniæ*, Z.
paralia, Z. (? = seq.)
tamaricis, Z.
Bennetii, Curt.

76. Stenoptilia, *Hb.*

Face with projecting tuft or conical horny prominence; ocelli distinct or concealed; tongue developed. Antennæ two-thirds, in ♂ ciliated ($\frac{3}{4}$—1). Labial palpi moderately long, porrected, second joint with tolerably appressed or loose rough scales, sometimes expanded towards apex, terminal joint moderate or short, tolerably filiform. Maxillary palpi obsolete. Tibiæ simple, outer spurs almost equal inner. Fore wings bifid, cleft from about two-thirds; vein 2 from two-thirds of cell, 3 from near angle, 5 and 6 short, 7 from near 8, 8 and 9 stalked, 10 from near 9, 11 tolerably remote. Hind wings trifid, third segment without black scales in dorsal cilia; vein 2 from before middle of cell, 3 from before angle, 5 and 6 very short, 7 and 8 divergent from beyond cleft.

A nearly cosmopolitan genus of some size.

miantodactyla, Z.
pelidnodactyla, Stein.
serotina, Z.
zophodactyla, Dup.
**islandica*, Stgr.
arida, Z.
coprodactyla, Z.
**Nolckeni*, Tgstr.
plagiodactyla, Stt.
**lutescens*, H.-S.
graphodactyla, Tr.
pterodactyla, L.
paludicola, Wallgr.
stigmatodactyla, Z.
**Mannii*, Z.

77. Alucita, *L.*

Face rounded, without tuft; ocelli concealed or obsolete; tongue developed. Antennæ two-thirds, in ♂ ciliated ($\frac{2}{3}$—1). Labial palpi moderate, ascending, loosely scaled or tolerably smooth, terminal joint short, obtuse or pointed. Maxillary palpi obsolete. Tibiæ simple, or thickened with scales on origin of spurs and centre of middle tibiæ, outer spurs two-thirds to three-fourths of inner, or almost equal. Fore wings bifid, cleft from about two-thirds; vein 2 from about four-fifths of cell, 3 and 4 from a point, 5 and 6 short, 7 from near 8, 9 absent, 10 approximated to 8 towards base, 11 from rather near 8. Hind wings trifid, third segment without black scales in dorsal cilia; vein 2 from about middle of cell, 3 absent, 5 and 6 very short, 7 and 8 divergent from beyond cleft.

Principally European and American, with stragglers in other regions. The variation in scaling of the tibiæ (and occasionally of the tarsi also) is specific merely, and quite insufficient for generic distinction.

lithodactyla, Tr.
gigantea, Mn.
Rogenhoferi, Mn.
Constanti, Rag.
monodactyla, L.
scarodactyla, Hb.
lienigiana, Z.
tephradactyla, Hb.
distincta, H.-S.
inulæ, Z.
carphodactyla, Hb.
**coniodactyla*, Stgr.
pectodactyla, Stgr.
ostcodactyla, Z.

78. Marasmarcha, *Meyr.*

Face with more or less projecting tuft; ocelli obsolete; tongue developed. Antennæ two-thirds, in ♂ ciliated (⅓). Labial palpi moderate, ascending, slender, terminal joint moderate, pointed. Maxillary palpi obsolete. Tibiæ simple, outer spurs nearly equal inner. Fore wings bifid, cleft from before two-thirds; vein 2 from near angle, 3 and 4 from a point or stalked, 5 and 6 short, 7 from near 8, 8 and 9 stalked, 10 absent, 11 from near angle. Hind wings trifid, third segment without black scales in dorsal cilia; vein 2 from before middle of cell, 3 absent, 5 and 6 very short, 7 and 8 divergent from beyond cleft.

A small genus, occurring in Europe, Central Asia, and Africa. It closely approaches the preceding, and is a development from it.

**ehrenbergiana*, Z.
agrorum, H.-S.
**rhypodactyla*, Stgr.
**trimmatodactyla*, Christ.
phæodactyla, Hb.
cinnamomea, Stgr.
microdactyla, Hb.

79. Gypsochares, n. g.

Face without tuft; ocelli obsolete; tongue developed. Antennæ two-thirds, in ♂ ciliated (1). Labial palpi moderate, subascending, second joint loosely scaled, somewhat tufted at apex beneath, terminal joint moderate. Maxillary palpi obsolete. Tibiæ hardly thickened, outer spurs nearly equal inner. Fore wings bifid, cleft from three-fifths; vein 2 from a point with 4, 3 out of 4, 5 and 6 very short, upper angle of cell produced, 7 out of 8, 9 absent, 10 separate, approximated to 8, 11 tolerably remote. Hind wings trifid, third segment without black scales in dorsal cilia; vein 2 from middle of cell, 3 absent, 5 and 6 very short, 7 to apex.

Includes at present only the following South European species.

baptodactyla, Z.

80. Crasimetis, n. g.

Face without tuft; ocelli obsolete; tongue developed. Antennæ two-thirds, in ♂ ciliated (⅔). Labial palpi moderate, ascending, loosely scaled, terminal joint short, pointed. Maxillary palpi obsolete. Tibiæ thickened with scales on origin of spurs, outer spurs almost equal inner. Fore wings bifid, cleft from about middle; veins 2 and 3 out of 4, 5 and 6 short, 7 absent, 9, 10 and 11 out of 8. Hind wings trifid, third segment without black scales in dorsal cilia; vein 2 from middle of cell, 3 absent, 5 and 6 short, 7 and 8 divergent from beyond cleft.

I know only the two following species, of which one is European, the other East Siberian. It is an interesting genus, as being obviously the ancestral form of *Pterophorus*.

brachydactyla, Tr.
amurensis, Christ.

81. Pterophorus, *Geoffr.*

Face without tuft; ocelli obsolete; tongue developed. Antennæ two-thirds, in ♂ ciliated (½—1). Labial palpi moderate, more or less ascending, filiform, second joint sometimes loosely scaled, terminal joint moderate or short, acute. Maxillary palpi obsolete. Tibiæ simple, outer spurs almost equal inner. Fore wings bifid, cleft from about middle; vein 2 from near angle or out of 4, or absent, 3 absent, 5 and 6 very short, 7 absent, 9 absent, 10 absent, 11 from a point with or out of 8 or absent. Hind wings trifid, third segment without black scales in dorsal cilia; vein 2 from middle of cell, 3 absent, 5 and 6 very short, 7 to apex.

A considerable genus, nearly cosmopolitan, but no truly indigenous species occurs in Australia.

caspius, Ld.
volgensis, Möschl.
spilodactylus, Curt.
galactodactylus, Hb.
**subalternans*, Ld.
phlomidis, Stgr.
pentadactylus, L.
confusus, H.-S.
punctinervis, Const.
xanthodactylus, Tr.
xerodactylus, Z.
**decipiens*, Ld.
baliodactylus, Z.
calcarius, Ld.
parthicus, Ld.
semiodactylus, Mn.

**marptys*, Christ.
tetradactylus, L.
malacodactylus, Z.
**chordodactylus*, Stgr.
icterodactylus, Mn.
ischnodactylus, Tr.
**desertorum*, Z.
**olbiadactylus*, Mill.
**nephelodactylus*, Ev.

8. ORNEODIDÆ.

Ocelli distinct. Tongue developed. Maxillary palpi obsolete. Fore wings six-cleft, cell very short, vein 5 absent, 7 separate, 8 and 9 coincident. Hind wings six-cleft, cell very short, 5 absent, 7 out of 6 near origin, 8 free.

The family consists only of the one genus. It stands quite isolated, the earlier connecting forms being apparently all extinct. Owing to the great degeneration of the veins, and the absence of earlier forms, it is impossible to fully trace its affinities, but there can be no doubt that it is a development parallel to the *Pterophoridæ*, but very distinct from that family.

82. Orneodes, *Latr.*

Face with projection of scales; ocelli distinct; tongue developed. Antennæ three-fifths, in ♂ minutely ciliated (¼). Labial palpi long, obliquely ascending, second joint with rough projecting scales beneath, more or less tufted towards apex, terminal joint moderate or long, pointed, slender or thickened in front with rough scales. Maxillary palpi obsolete. Posterior tibiæ sometimes partially rough-haired above, outer spurs one-half to two-thirds of inner. Fore wings six-cleft, cell very short; veins 5 and 6 absent, 7 separate, 9 and 10 absent, 11 separate or out of 8. Hind wings six-cleft, cell very short; vein 5 absent, 6 out of 7, 8 free, approximated to 7.

This genus appears to be principally developed in Europe, Africa, and Australia, but is not of any great extent; stray species are also known from North and South America, and it is likely enough that others will be found there, as the species are inconspicuous and easily overlooked.

zonodactyla, Z.
dodecadactyla, Hb.
palodactyla, Z.
grammodactyla, Z.
**perittodactyla*, Stgr.
desmodactyla, Z.
hexadactyla, L.
Huebneri, Wallgr.
**cymatodactyla*, Z.

Appendix.

The following species, which are unknown to me, I have not ventured to classify; they may be referable to *Pyrausta*.

**amasialis*, Stgr.
**pauperalis*, Stgr.
**gutturalis*, Stgr.

Explanation of Plate XV.

Fig. 1. Fore wing of *Aglossa pinguinalis*, showing veins numbered.
2. Fore wing of *Eurrhypara urticata*.
3. ,, *Sclerocona acutella*.
4. ,, *Stenoptilia pterodactyla*.
5. ,, *Crasimetis brachydactyla*.
6. ,, *Pterophorus spilodactylus*.
7. ,, *Agdistis Bennetii*.
8. ,, *Orncodes hexadactyla*.
9. Hind wing of *Aglossa pinguinalis*, showing veins numbered.
10. Hind wing of *Eurrhypara urticata*.
11. ,, *Talis quercella*.
12. ,, *Stenoptilia pterodactyla*.
13. ,, *Pterophorus spilodactylus*.
14. ,, *Agdistis Bennetii*.
15. ,, *Orneodes hexadactyla*.
16. Labial palpus of *Pyrausta repandalis*.
17. ,, *Scoparia lætella*.
18. ,, *Metaxmeste schrankiana*.
19. ,, *Pleuroptya aurantiacalis*.
20. ,, *Notarcha multilinealis*.
21. ,, *Satanastra argyria*.
22. ,, *Agrotera nemoralis*.
23. ,, *Stericta inimica*.
24. ,, *Synaphe consecratalis*.
25. ,, *Acropentias obtusalis*.
26. Maxillary palpus of *Pyrausta repandalis*.
27. ,, ,, *Mecyna polygonalis*.

Fig. 28. Frontal projection (from above) of *Titanio pentodontalis.*
29. ,, ,, ,, *T. normalis.*
30. ,, ,, ,, *Metasia suppandalis.*
31. ,, ,, ,, *Loxostege Eversmanni.*
32. Frontal projection (lateral view) of *Cornifrons ulceratalis.*

XIV. *Additions to the* Cicindelidæ *fauna of Mexico, with remarks on some of the previously-recorded species.*

By Henry Walter Bates, F.R.S., F.L.S., &c.

[Read May 7th, 1890.]

Plate XVI.

The object of the present paper is to make known the additions to the coleopterous fauna of Mexico, as far as regards the family *Cicindelidæ*, which have been received by Messrs. Godman and Salvin since the completion of Coleoptera, vol. i., part 1, of the 'Biologia Centrali-Americana,' and to describe such species and well-marked varieties as appear to be new to Science, correcting at the same time the descriptions and identifications of known species by the light of the more complete material since received. In the 'Biologia' the total number of *Cicindelidæ* recorded was 61 belonging to 5 genera. In the present paper the total is increased to 78, the additions, 17 species, belonging all to the restricted genus *Cicindela*.

Cicindela obsoleta, Say.

Var. or race *Santaclaræ*.

Elytra utrinque maculis quatuor discretis (1ma humerali 2nda infra humerali 3ia et 4ta medianis oblique positis) lunulaque apicali interdum interrupta apice intus recurva, albis. Colore supra variat; (1) sat læte viridis (sicut in *C. campestris*) et (2) purpureo-fusca, opaca marginibus anguste lætioribus. Long. 16—20 mm.

Hab. Santa Clara in Chihuahua (*Höge*).

Excepting the conspicuous and separated maculation of the elytra this form shows no difference from the type-form, and from numerous varieties of *C. obsoleta* found in Colorado, New Mexico, and Texas, none of which exhibit a similar number and form of spots. The second and third spots are always distant from the margin, and the

colour of the green variety is clearer than in Leconté's var. *prasina*. In all the varieties the penultimate joint of the labial palpi is white in the ♂, and dark metallic, like the rest of the palpi, in the ♀; the sculpture of the head and thorax is very faint, and the elytra are smooth except near the base, where they are distantly granulate-punctulate; the under surface is shining brassy green, the abdomen inclining to chalybeous; the middle part of the labrum is produced, tridentate in the ♂ and quinquedentate in the ♀, the lateral teeth being very small.

Cicindela thalestris. (Pl. XVI., fig. 1).

C. obsoleta (Say) paullo minor fronte utrinque acutius striata corporeque subtus fere toto glabro; supra opaca, viridis, elytris (marginibus exceptis) fusco-viridibus immaculatis, subtus nigro-chalybea lateribus plus minusve purpureis; labro ♂ ♀ medio parum producto et valide tridentato; palpis labialibus articulo penultimo ♂ albo-testaceo, ♀ fusco-testaceo. Long. 18 mm.

Hab. Ventanas in Durango (*Höge*).

Closely allied to *C. obsoleta*, but having a different facies owing to the somewhat more convex and rounded thorax, and relatively shorter elytra gradually though slightly widened in both sexes to a little before the apex. The colour does not differ much from Texan examples of *C. obsoleta*, var. *prasina*, Lec., but the species is certainly different, and the armature of the labrum, strongly tridentate in both sexes, whereas it is five-toothed, the middle tooth alone large, in *C. obsoleta* ♀, readily distinguishes them. The species, in fact, is somewhat intermediate between *C. obsoleta* and *C. pulchra*. In all the examples the under surface is destitute of hairs; none at all are visible on the sides.

Cicindela scotina.

Elongata, atra opaca femoribus cyanescentibus; labro albo, medio (♂) paullo haud abrupte producto tridentato (dentibus 2 lateralibus parvis), fronte plana subtilissime vix perspicue strigulosa, oculis mediocriter prominentibus; thorace quadrato lateribus rotundatis, sulcis profundis, disco vix perspicue striguloso; elytris dimidio basali aspere sat distanter punctatis dimidio apicali lævi,

margine haud serrulato; pectore opaco sparsissime piloso, ventro nitido. Long. 13 mm. ♂.

Hab. Durango (*Flohr*). One example.

A small species of the *obsoleta* group, resembling much the typical form of *C. obsoleta*, with which it agrees in colour, form of labrum, and sculpture of elytra. It differs in the rather more prominent eyes and the narrower and more rounded thorax.

Cicindela viatica, Chevr.

Var. *nigrilabris*. Sericeo-nigra elytris lateribus corporeque subtus cum femoribus interdum leviter cyaneo-tinctis; labro in ♀ semper nigro, in ♂ albo interdum nigro maculis duabus albis, raro fusco-nigro. Long. 10—12 mm.

Agrees precisely with the silky green or greenish blue type-form in all respects, except in the black colour of the body and the labrum of the ♀. The eyes seem, however, to be somewhat less prominent; the peculiar sculpture of the elytra is the same, *viz.*, large but shallow punctures in one or two slight longitudinal depressions, and a rather close punctuation towards the apex; the smooth apical edge of the elytra, the glabrous under surface, and the longitudinally convex labrum, much produced in the middle and tridentate, less strongly in ♂ than in ♀, with lateral teeth short and broad, are also the same. The palpi are black in both sexes, much shorter in *C. viatica* and its variety than in the other species of the genus, without, however, any dilatation of the penultimate joint of the labials.

Hab. Refugio in Durango (*Höge*). A good series of examples.

Cicindela melania.

C. viatica var. *nigrilabri* similis sed valde differt thorace transverso lateribus rotundatis; elytris lævibus palpis longioribus gracilioribusque, etc. Paullo major toto nigra vix sericea; labro (♂) medio late sed haud abrupte et leviter producto, denticulis tribus minutis vix conspicuis; fronte plana toto subtiliter strigulosa; thorace transversim quadrato, lateribus ante medium rotundatis, margine sicut in *C. viatica* albo-piloso; elytris humeris magis rectangulatis apice latius rotundatis, foveolis umbilicatis serie obliqua. Long. 12 mm. ♂.

Hab. Refugio in Durango (*Höge*).

Two males only, perfectly similar, with the remarkable exception that in one the palpi are entirely black, and in the other the penultimate joint of the labials is brownish testaceous.

Cicindela Ritteri. (Pl. XVI., fig. 2).

C. pulchra (Say) appropinquat sed valde differt capite et thorace relative angustis elytrisque longioribus et lateribus; viridi-cyanea elytris violaceis immaculatis, pectore abdomineque violaceo-nigris; labro (♀) albo, vix convexo medio paullulum producto, truncato, unidentato; oculis sat prominentibus collo convexo, fronte glabra utrinque striata; thorace sat angusto, subcylindrico sed brevi, nitido parum striguloso; elytris elongato-oblongis convexis apice late rotundatis sutura recte spinosa, margine haud serrato, versus basin sicut in *C. pulchra* sat grosse et crebre punctata, postice subtilissime punctulatis; corpore subtus fere glabro. Long. 16 mm. ♀.

Hab. Villa Lerdo in Durango (*Ritter*).

One example only has been received of this fine and apparently very distinct species. By Herr Höge's desire I name it after the late Mr. Enrique Ritter, manager of the Hacienda of Coyote, near Lerdo, who took two or three specimens of it.

Cicindela plurigemmata. (Pl. XVI., fig. 3).

C. Flohri similis sed certe diversa, abdomine cæruleo-metallico elytrisque foveolis magnis numerosis cyaneis conspersis. Supra fusco-cuprea sericeo-opaca; thorace subrotundato, sulcis transversis et dorsali profundis disco parum distincte striguloso, sublævi; elytris elongato-ovatis medio disco utrinque striga oblique et interdum guttula submarginali ab humeris longe distanti, albis. Long. 12 mm. ♀.

C. semicircularis, Klug, Jahrb. d. Ins., i., p. 33 ?.

Hab. Refugio in Durango (*Höge*). Three examples only, females.

In general form and other characters this species resembles *C. Flohri*, and seems to have a close relationship with it; but it differs in the uniform metallic cyaneous colour of the under side, and in the sculpture of the elytra, in which latter respect it approaches *C. cyaniventris*. The labrum (white) is advanced in the middle, subtruncate, with a central tooth, and the angles

of the truncature well-marked. The eyes are somewhat strongly prominent, and the sides of the vertex are sharply striated, the central part, as well as the occiput and neck, being nearly smooth or very finely alutaceous, like the convex disk of the thorax on each side. The elytra are rather strongly punctulated throughout, towards the base granulate-punctate, and the large bluish rounded shallow umbilicated foveoles are scattered from the base nearly to the apex; the apices are separately rounded, the edges not serrulated, the sutural apex spinose. The sides of the body are thinly and loosely pubescent, the trochanters blackish, the legs purple-coppery, cyaneous towards the base of the femora.

This species comes nearer Klug's description of his *C. semicircularis* than any other Mexican form that I have seen. It agrees in form, which Klug says is that of *C. flexuosa*, but it differs in the colour of the head, in the labrum being distinctly unidentate in the ♀, in the impunctate thorax, and in the absence of a second submarginal spot on the elytra; and it may therefore be a nearly allied and distinct species. At any rate, the species referred to *C. semicircularis* in the 'Biologia C.-A.,' on the authority of French collections, cannot be that of Klug, who describes the labrum as scarcely armed and the thorax as finely punctured, the wrongly-named insect having the labrum greatly produced, almost narrowly sublobate in the middle in both sexes and strongly tridentate, and the thorax rather coarsely and densely sculptured. It will require, therefore, a new name :—

Cicindela rugatilis.

Cicindela semicircularis, Bates, Biol. Centrali-Amer., Col., i., 1, p. 6, t. 1, f. 19 (nec Klug).

Hab. Toluca (*Sallé, Höge*).

Quoad formam *C. tuberculatæ* (Fab., Nov. Zealand), nec *C. flexuosæ*, Fab., similis. Cupreo-fusca sericeo-opaca, elytris plus minusve nigro-fusco nebulosis, puncto submarginali longe post humerum, altera simili marginali post-medium, fascia paullo obliqua discoidali mediana (fere semper interrupta) maculaque exteriori subapicali obliqua interdum in lineam tenuem marginalem versus apicem ducta, albis; maculis sæpe partim deficientibus guttis tribus interdum solum relictis; labro (♂ ♀) brevi, medio

sublobatim producto et valde tridentato angulis lateralibus rectis; thorace antice rotundato prope basin sat fortiter angustato, undique confuse ruguloso sulcis profundis; elytris supra inæqualibus punctulatis foveolisque numerosis umbilicatis cyaneis in seriebus duabus irregulariter dispositis; subtus nigro cyanea utrinque sparsim pilosa, episterno prothoracico igneo-cupreo subglabro; pedibus cyaneis partim igneo-cupreis. Long. 10—11 mm.

The elytra in both sexes are conjointly and broadly rounded at the apex, the apical edge not serrated, and the sutural angle scarcely spinose. The palpi are all metallic, the penultimate of the labials dark brownish in the ♂. The head and thorax are often of a clearer coppery hue.

Cicindela præcisa. (Pl. XVI., fig. 4).

C. hemichryseæ (Chevr.) subsimilis sed multi robustior, sat brevis capite relative crasso oculis parum prominentibus, thorace subcylindrico postice angustato; fusco-ænea, elytris obscure viridiæneis alutaceo-opacis fusco-cupreo strigatis passim cyaneo-punctulatis, post-medium fascia brevi parum obliqua curvata vel leviter biflexuosa a margine distante guttaque submarginali ante apicem, albis. Long. 10 mm. ♂ ♀.

Hab. Chilpancingo in Guerrero (*H. H. Smith*, *Höge*).

Though similar in form to *C. hemichrysea*, this species can scarcely belong to the same group, as the labrum is totally different, being scarcely convex, broadly produced in the middle, with the anterior margin of the produced part more or less truncated and unidentate, and a conspicuous submarginal row of large setiferous punctures 10 or 12 in number. The head is much thicker and broader behind the eyes, which latter are much less prominent; the vertex is only slightly depressed and finely striated, the declivous forehead confusedly rugulose. The thorax is relatively long, gradually narrowed behind, with the transverse sulci only faintly impressed, the dorsal sulcus more strongly so, though abbreviated at both ends, and deeply incised at its basal termination; the disk on each side finely and closely strigulose. The elytra are relatively short, slightly and gradually dilated from the base to near the apex, the shoulders rectangular. The discoidal white fascia lies considerably behind the middle, and in the centre of each elytron is curved or feebly biflexuose, only slightly

oblique and thickened at its inner end; a submarginal præapical spot is the only other white marking. The elytra in both sexes are conjointly rounded at the apex, with small sutural tooth, the margin not serrulated. Beneath greenish æneous, the episterna coppery æneous and more brilliant. The femora and tibiæ cupreous, the tarsi violaceous. The palpi whitish, with the terminal, in the maxillaries also the penultimate joint, metallic. The sides of the body beneath, especially the abdomen and metasternum, are clothed not densely with long incumbent pubescence, the episterna being nearly glabrous and partially strigulose and punctured.

Cicindela guerrerensis. (Pl. XVI., fig. 5).

C. æneicolli (Bates) et *punctulatæ*, Fab., affinis. Elongata supra cuprea capite et thorace nitidis elytris subopacis his puncto sublaterali infra humeros fascia tenui post-median obliqua S-formi (marginem haud attingenti) lunulaque tenui apicali antice oblique recurva et paullulum incrassata, albis; interdum linea tenui alba marginali inter fasciam et lunulam; thorace angusto lateribus rectissimis. Long. 11—12 mm. ♀.

Hab. Tepetlapa in Guerrero (*H. H. Smith*); Chilpancingo in Guerrero (*Höge*).

Two examples, one ♂ rich coppery above, the other a ♀, evidently discoloured, dull coppery brown, both agreeing in nearly all other respects. The labrum is similar in form to that of *C. æneicollis*, the produced middle part having a truncated edge unispinose in the ♂, and with the angles produced, and therefore subtrispinose in the ♀; the penultimate joint of the labial palpi is white in the ♂, and dull fuscous in the ♀. The apex of the elytra is the same in both sexes, being conjointly and acutely rounded, with an acute spine at the sutural angle. The eyes are only moderately prominent, and the head appears narrow; the forehead and the concave vertex are closely striated, coppery red, with two cyaneous vittæ. The thorax is very finely rugulose-striate, the depressions cyaneous, the sides pubescent. The alutaceous elytra are subsparsely and equally punctulate, the points cyaneous and free from accompanying granules, and the usual umbilicated foveoles are seen near the base only. Beneath the colour is cyaneous, with the episterna brilliant fiery coppery. The legs are cupreous

in certain lights, and the sides of the body, especially the abdomen, are clothed with longish scarcely adpressed hairs.

Cicindela speculans. (Pl. XVI., fig. 6).

C. præcisæ affinis, minor et minus convexa; æneo vel cupreo-fusca subopaca; elytris vitta lata abbreviata marginali (a basi usque ad medium) ramulum flexuosum versus discum emittenti politissima, post-medium fasciola tenui flexuosa discoidali guttaque posteriori (interdum deficienti) a margine longe distanti, albis; thorace sicut in *C. præcisa* postice angustato lateribusque rectis vel (♂ solum ?) leviter rotundatis. Long. 5½—7½ mm. ♂ ♀.

Hab. Omilteme in Guerrero, 8000 ft. (*H. H. Smith*).

This curious little species is evidently closely allied to *C. præcisa*, though having much in common with *C. Hoegi* (Bates). The head and thorax are of nearly the same form, at least in the ♀, the ♂ differing strangely in the head being narrower and less convex behind the eyes, and the thorax less rectilinear on the sides. The basal part of the elytra appears flattened, owing to the epipleuræ being vertical in conjunction with the mirror-like marginal stripe, and forming a rectangular edge with the disk, which edge is curiously sinuated at the point, where a brilliantly polished narrow subflexuous oblique vitta is emitted to the disk. The eyes are more prominent than in *C. præcisa*, and the concave vertex more completely covered with sharp partly concentric striæ. The thorax is finely striated in different directions, and the sulci are still more faintly impressed than in *C. præcisa*. The elytra are finely alutaceous, beset with bluish green punctures, the interstices of which are minutely marbled with cupreous; the apical margin is not serrulated, and is oblique and straight for a short distance near the sutural angle, which latter is spinose. Beneath blackish blue, glabrous on the sides; femora aurescent. The labrum is broadly produced, subtruncate, unispinose in the middle, as in *C. præcisa*, but the centre is strongly longitudinally convex, and the submarginal setiferous punctures are less numerous and inconspicuous.

Cicindela punctulata, Fabr.

Var. *Chihuahuæ*.

Hab. North America, Arizona (*Morrison*); Mexico, Santa Clara in Chihuahua, and Chihuahua City (*Höge*).

On comparing a good series of both forms this variety or race presents a very distinct appearance from the more northern *C. punctulata*. It is on the average smaller, more slender, the thorax especially narrower, and the punctuation of the elytra is finer and closer; all the punctures, even to the apex, are accompanied by a distinct granule. The colour differs in being dark greenish blue, but the small and variable white markings of the elytra are the same.

Cicindela politula, Leconté, Tr. Am. Ent. Soc., 1875, 159.

This Texan species has been met with by Herr Höge at Monterey, in Nueva Leon.

Cicindela Dugesi, Bates.

Biologia Centrali-Americana, Col., i., 1, p. 258.

This species has, since the above-cited description was published, been received in numbers from various localities, particularly in the Province Guerrero. The first examples received were all of a coppery æneous hue; most of those lately arrived are greenish brassy brown, opaque, with rather brighter æneous or coppery head, thorax, and elytral suture, the green umbilicated foveoles of the latter conspicuous against the dark colour. The white markings also are more developed than is described in the type-form, in which they consist of a short oblique streak on the disk, with a small posterior discoidal spot; many examples having an apical lunule and marginal posterior spot. The following variety has the aspect of a distinct species:—

Var. *C. calomicra*.—Elytris lunula humerali apice prolongata et cum fascia mediana conjuncta, hac postice cum macula marginali posteriori connexa, lunula apicali antice versus discum prolongata ibique cum macula postero-discoidali conjuncta. Long. 8—9 mm.

Hab. Cuernavaca in Morelos (*Höge*); Chilpancingo in Guerrero (*H. H. Smith, Höge*).

The white markings in their full development much resemble those of the var. *Taretana* of *C. hydrophoba* (Chevr.) In some examples the humeral lunule is widely interrupted in the middle, and the apical lunule disconnected from the postero-discal spot, or the latter disappears altogether. The abdomen and four posterior

trochanters are red in all the varieties, and the species clearly belongs to the *rufiventris* group, from all the others of which it is distinguished, besides its small size, by the vaulted subsemicircularly produced labrum, unarmed in the ♂, and sharply unidentate in the ♀.

Cicindela deliciola. (Pl. XVI., fig. 7).

C. dysentericæ (Bates) similis sed differt, inter alia, elytris brevioribus grossius punctatis sicut inæqualibus. Supra opaca pallide viridi-azurea vel grisescenti-cupreo-fusca, elytris plus minusve fusco-nebulosis, thorace transverso subrotundato, elytris lunula humerali postice minime prolongata, fascia mediana parum obliqua cum vittula marginali conjuncta et pone hanc macula ovata marginali, lunulaque apicali tenui, albis; interdum signaturis omnibus (lunula apicali excepta) prope marginem conjunctis. Long. 9 mm. ♂ ♀.

Hab. Real de Monte in Hidalgo (*Höge*).

Rather smaller and relatively shorter than *C. Catharinæ* and *C. dysenterica;* thorax rather more transverse and more strongly rounded, and throughout densely and rather coarsely rugulose. The elytra are simply but rather strongly punctate, and not, as in *C. Catharinæ*, minutely granulated. The white markings differ from both species especially in the median fascia being uninterrupted and less oblique, by which its dilated apex lies very little behind the middle of the elytra and nearer the suture; a submarginal line extends from the humeral lunule to beyond the middle, but it is narrower and lies nearer the margin than in *C. dysenterica*. The head is sharply and strongly striated, the striæ covering the whole crown, and the forehead has two purple vittæ. The thorax is strongly sculptured. The elytra are nearly conjointly rounded at the apex, the apical margin not serrulated, and the suture not spined. The hind trochanters are dark metallic, the abdomen red, with base more or less dusky. Beneath, the prosternal episternum has a few long white hairs and strong punctures near the coxæ, the metasternal episterna are nearly glabrous, and the sides of the abdomen thinly pubescent, both the episterna are golden coppery, the rest of the pectus green, the hind coxæ golden. The labrum is white and subsemicircularly rounded, the margin sinuated on each side, and the

angles distinct though obtuse, the middle in the ♀ unidentate, in the ♂ unarmed.

Cicindela rufiventris, Dej.

Among the great number of examples of the different varieties from very numerous localities referred in the 'Biologia' to this species on the authority of Chaudoir, I have failed to find a single specimen agreeing with Dejean's description in the essential peculiarity of the elytral markings, *viz.*, a crescent-shaped apical lunule and three detached spots in triangle on the disk. The detached spots of course represent the marginal and discoidal ends of the median fascia and the posterior marginal spot, but in Mexican examples it invariably occurs that when the median fascia is dissolved into spots the apical lunule is also disintegrated. The apical lunule remains entire when the median markings degenerate only in closely-allied N. American species, e. g., *C. cumatilis*. Dejean's example was from Palisot de Beauvois's collection, and labelled "St. Domingo"; whether this is correct, or the specimen came from the south-eastern States, is doubtful, and the Mexican forms perhaps do not belong to the same species.

C. rufiventris (?) var. *16-punctata*, Klug (= *rubriventris*, Chevr.).—In its typical form this var. is small (9—10 mm.), generally dark and bluish in tint, and the markings form on each elytron eight equal-sized spots, the two median spots sometimes connected by a thin line. It occurs chiefly in the vicinity of the city of Mexico. The hind trochanters are dark brassy brown, the labrum scarcely at all produced in the middle even in the ♀.

Var. *C. Ventanasa*.—Same as *16-punctata*, but larger (10½—12 mm.), and relatively narrower. Apparently common at Ventanas in Durango, and at La Noria in Sinaloa. This var. graduates into the var. *Sallæi* of Sinaloa.

Var. ?. — A little longer than *16-punctata* (10½—11 mm.); elytra more parallel, dark purple-coppery with green reflections; median fascia and apical lunule entire (narrow in the middle); trochanters the same. Northern Sonora and Chihuahua; also Arizona.

Var. *Sallei*, Chevr. — Distinguished from var. *16-punctata* and *Ventanasa* chiefly by the larger elytral

spots and markings, a character specially mentioned by the describer, who likens the species to *C. aulica*, Dej. The hind trochanters are generally brassy ferruginous, but they are sometimes clear red. The size given by Chevrolat is 10½ mm., but the greater number of examples measure 11—12 mm., or a little more. The labrum is scarcely produced in the middle, unidentate in the ♀. With some local variation it ranges over a wide area; Guatemala, Ceno de Plumas in Oaxaca (*Höge*); Jalapa, Chilpancingo, Iguala, and Mescala in Guerrero (*H. H. Smith*); and Ventanas in Durango (*Höge*). Its southern varieties merge gradually into the following:—

Var. *Mellyi*, Chaud., Bates, Biol. C.-A., Col., i., 1, p. 8, t. 1, f. 7, in which the elytra is of a richer velvety bluish black, and the head and thorax opaque coppery red (Oaxaca, Guatemala), and

Var. *calochroïdes*, Motsch., in which the two (posterior) marginal spots of the elytra have disappeared, and the apical lunule is often reduced to a spot near the suture. Chontales, Nicaragua.

Cicindela hydrophoba, Chevr.

This species is very distinct from *C. rufiventris*, in general form, length, and convexity of the labrum, and in the constant red colour of the hinder trochanters. It seems to have nearly the same range. The only additional locality I have to record is Temax in North Yucatan (*Gaumer*). Herr Höge obtained a large series of the beautiful variety *5-notata* at Acapulco.

Cicindela nebuligera. (Pl. XVI., fig. 8).

C. rufiventris var. *Sallæi* affinis. Lætius aurato-cuprea, elytris utrinque disco fusco-nigro; thorace prope basin distincte angustato subtiliter ruguloso; elytris maculis humerali et posthumerali, fascia mediana obliqua S-formi, macula posteriori marginali majori, lunulaque apicali integra sat lata interdum cum macula postero-discoidali conjuncta; trochanteribus cum medio pectore læte æneis episternis igneo-cupreis, abdomine rufo; labrum antice late arcuatim productum medio brevissime unidentatum margine utrinque leviter sinuato angulis distinctis. Long. 11 mm. ♂ ♀.

Hab. Refugio in Durango (*Höge*).

There are three examples only of this distinct species

of the *rufiventris* group. The elytra are punctured, as in *C. sallæi* and allies, but the umbilicated foveoles are longer and more numerous towards the base; the conjointly rounded apices have nearly smooth edges.

Cicindela rectilatera, Chaud.

This Texan species occurs in the States of Tamaulipas and Coahuila, under the same form as in Texas; but at Villa Lerdo in Durango, where it has been collected in large numbers by Mr. Höge, it presents itself as a tolerably well-marked variety, being generally smaller, the elytra relatively a little shorter, and the white spots larger, the two median spots being sometimes more approximated than usual with traces of a fine line connecting them together.

Cicindela flavopunctata, Chevr.

The southern form of this common *Cicindela* is on the average smaller, and has a decidedly narrower thorax; the hind trochanters also are always red like the abdomen, the latter having little or no trace of fuscous at the base. It is a more important variety than any of the others described under this species, and I propose to call it after the name of the State which appears to form its head-quarters.

Var. *C. Chiapana*. Thorace angusto cylindrico, elytris utrinque maculis quinque albis, abdomine trochanteribusque posticis rufis. Long. 10 mm. ♂ ♀.

Tapachula in Chiapas; La Noria in Sinaloa (*Höge*); Guatemala (*Champion*), near the city (*Salvin*).

Specimens nearly approaching this in the small size and narrow thorax occur in Central Mexico, but they have the same blackish brown trochanters and base of abdomen as the ordinary typical and rather larger form with quadrate thorax. In Nicaragua and Costa Rica another allied but less slender var. occurs.

Cicindela sinaloæ.

Sat angusta, elytris elongato-subovatis. Cupreo-fusca sub opaca, oculis mediocriter prominentibus, thorace quadrato, elytris lunula humerali postice incrassata, fascia mediana valde obliqua recta plerumque interrupta cum vittula lata marginali conjuncta lunu-

laque apicali antice oblique prolongata et extus paullo recurva, albis; pedibus elongatis, trochanteribus apiceque abdominis rufis. Long. 8—11 mm. ♂ ♀.

Hab. Mazatlan (*Höge*).

A small species having the facies (except the longer legs) of *C. sallæi* and allies, but in all its essential characters belonging to the same group as *C. sperata* and *Gabbii*. The labrum is short and broad, with straight front margin in the ♂, and slightly produced and tridentate in the middle in the ♀. The vertex is only moderately depressed between the eyes, and finely striated on the sides. The thorax is quadrate, not much narrower than the head with the eyes, and not greatly exceeded in width by the elytra; its sides are nearly straight, the sulci deep, and the surface minutely sculptured. The elytra are broadest in the middle, and the apices are separately rounded in both sexes, in the ♂ with a short oblique sinuation near the sutural spine, in the ♀ more strongly rounded and produced, with the sutural apex somewhat retracted and the outer margin oblique and subsinuated to the ante-apical angle, which is distinctly indicated; the surface is subgranulate-punctate throughout, the apical margin faintly serrulated. The sides of the body are rather densely clothed with adpressed hairs. The femora are brilliant green, their apices and the tibiæ translucent reddish.

Cicindela fera, Chevrolat.

This distinct species, so similar in form and elytral markings to *C. repanda* (Dej.), but distinguished by the red apical half of the abdomen, the smoother, darker, more opaque, and behind dilated elytra and the glabrous forehead, has been taken in great number by Herr Höge at Villa Lerdo in Durango. He met with it also in more southerly localities, *viz.*, San Juan Bautista in Tabasco, and Tehuantepec.

Cicindela curyscopa. (Pl. XVI., fig. 9).

C. boopi (Mann.) et *C. aurariæ* (Klug) proxime affinis, differt *inter alia*, elytrorum margine albo postice profunde indentata. Ænea subnitida; capite lato oculis maxime prominentibus, thorace valde rotundato, elytris margine albo laterali lato medio paullo dila-

tato et prope angulum ante-apicalem profunde indentata. Long 9—12 mm. ♂ ♀.

Hab. Mazatlan in Sinaloa (*Höge*). A good series, offering no variation.

The colour above is brownish brassy, beneath more brilliant and partly golden, with the trochanters, base of femora, and apical segment of the abdomen, fulvo-testaceous. The labrum is broad and short, but triangularly advanced in the middle, and unidentate in both sexes, the front margin on each side strongly sinuated. The thorax is rather abruptly and strongly rounded after the anterior transverse sulcus, the surface transversely and irregularly rugulose. The elytra, coppery in certain lights, are punctulated throughout, and conjointly acuminate, with a sutural spine; the margin (not serrulate) is oblique and flexuous (more strongly so in the ♀) to the distinct though rounded ante-apical angle. The sides of the body beneath are moderately densely clothed with adpressed hairs. The legs are long and extremely slender, but the claws are not so long as in *C. macrocnema* and allies, being much shorter than the fifth tarsal joint.

Cicindela sperata, Leconté, Tr. Am. Phil. Soc., xi. (1856), p. 50.

Taken in considerable number by Herr Höge at Nuevo Laredo in Tamaulipas, and Villa Lerdo in Durango.

Cicindela psilogramma. (Plate XVI., fig. 10).

C. speratæ (Leconte) primo intuitu similis sed valde differt elytris apice utroque sexu conjunctim regulariter rotundatis, trochanteribus cupreo-violaceis, etc. Elongata, supra obscure cupreo-fusca, elytris lunula basali (apice haud recurva) fascia mediana paullo flexuosa valde obliqua apice prope suturam leviter recurva extusque cum vittula marginali conjuncta, lunulaque apicali (antice rectangulariter inflexa) albis, signaturis omnibus tenuibus; thorace angusto fere cylindrico. Long. 11—13 mm. ♂ ♀.

Hab. Villa Lerdo in Durango (*Höge*). A large series of examples.

Similar in form and colour to *C. sperata*, but the white markings differ a little from the most slenderly marked examples of that species, in the humeral lunule

being less curved behind and not thickened at the apex, and in the apical lunule being very abruptly bent. The species forms a transition between the *sperata-marginata* group and the *trisignata* and *hirticollis* group; the white pubescence of the sides of the body beneath, though rather dense, is less adpressed and felted than in *C. marginata* and allies. The labrum is short and broad, rectangular, with the median part very slightly produced even in the ♀. The thorax is narrow, nearly cylindrical, and minutely, irregularly sculptured. The elytra are proportionally rather long, broader behind, with conjointly rounded and sharply serrulated apical margin; the surface is very regularly, equally, and finely granulate-punctate, with very dense and fine punctuation on the interstices. The under side and legs are bluish green, the four posterior trochanters purple-metallic.

Cicindela leuconoë. (Pl. XVI., fig. 11).

C. macrocnema (Chaud.) affinis et similis sed constanter differt, *inter alia*, elytrorum fascia mediana haud obliqua, prope suturam cum vittula suturæ parallela conjuncta. Valde elongata, pedibus posticis longissimis; æneo-vel cupreo-fusca, elytris opacis macula utrinque basali, lunula humerali, fascia mediana curvata transversa cum vittula subsuturali et vitta latiori marginali conjuncta lunulaque apicali antice valde curvata et incrassata, albis. Variat: (1) signaturis omnibus plus minusve coalescentibus, (2) signaturis tenuissimis fascia mediana lunulaque apicali interruptis. Long. 13—15 mm. ♂ ♀.

Hab. Manzanillo in Michoacan, Acapulco in Guerrero (*Höge*).

Distinguished from other members of the group with greatly elongated legs and corresponding claws by the median fascia lying across the elytron, and ending in a short vitta parallel to the suture. The surface of the elytra is minutely granulated throughout, as in *C. macrocnema;* and the apex, as in that species, is conjointly rounded in the ♂, more prolonged and towards the suture separately rounded in the ♀, with the edge serrulated. The labrum is short and broad, quadrangular, with straight front edge and small central tooth. The under surface, legs, and trochanters are brilliant coppery, with the abdomen and middle of the sterna dark æneous; the sides clothed with adpressed hairs.

There is a large series of this elegant species from each of the two localities named above. Those from Acapulco show nearly all a larger extension of white colour on the elytra than those from Manzanillo.

Cicindela debilis. (Pl. XVI., fig. 12).

C. celeripes (Leconte) affinis. Parva angusta, thorace fere cylindrico angusto; fusco-nigra (capite plus minusve cuprascenti) raro viridis, subtus nigra vel cyanea metallica, supra opaca; elytris vitta submarginali (apud humeros et versus apicem marginem attingenti) intus bidentata guttaque discoidali interdum per fasciam tenuem obliquam cum vitta marginali conjuncta, albis, margine ipso plus minusve polito, cupreo. Long. 8—9 mm.

Hab. Ciudad in Durango (*Höge*).

The upper surface is opaque, so that the sculpture of the thorax and elytra is scarcely visible. The labrum is white, produced in the middle and unidentate, the anterior margin being sinuated and the angles subrectangular. The eyes are rather large and prominent, the vertex depressed, and with the forehead densely and finely strigose. The thorax is narrow and nearly cylindrical, a little narrowed near the base; the sides are clothed with white laid hairs. The elytra are rather narrow, though together about twice as broad as the thorax, oblong in the ♂ and elongate-subovate in the ♀; the apical margins in the ♂ are rather sharply rounded and sinuated close to the sutural apex, which is spined and considerably retracted in the ♀. The under surface, especially on the metasternum, is sparsely and loosely pubescent. The trochanters, apex of femora, and the whole of the tibiæ and tarsi, are fulvo-testaceous

C. celeripes, Lec., in Chaudoir's catalogue, is the type of a group (to which *C. debilis* belongs) placed next to the *C. germanica* group.

Explanation of Plate XVI.

Fig. 1. *Cicindela thalestris.*
2. ,, *Ritteri.*
3. ,, *plurigemmata.*
4. ,, *præcisa.*
5. ,, *guerrerensis.*
6. ,, *speculans.*
7. ,, *deliciola.*
8. ,, *nebuligera.*
9. ,, *curyscopa.*
10. ,, *psilogramma.*
11. ,, *leuconoë.*
12. ,, *debilis.*

XV. *A Catalogue of the Rhopalocerous Lepidoptera collected in the Shan States, with notes on the country and climate.* By Neville Manders, M.R.C.S., F.E.S., Surgeon, Army Medical Staff.

[Read June 4th, 1890.]

Having spent two years on active service and intermittent collecting in the unknown districts of the Cis Salween Shan States, I have thought that a short account of the country, together with a catalogue of the Lepidoptera (Rhopalocera) collected during this time, would prove not without interest to Fellows of the Society.

I think the catalogue will not be without interest, for, though few new species are therein described, yet I hold that one of the most interesting entomological questions of the day is the distribution of insects; and, as the vast tract of country lying between Assam and Sikkim, on the one hand, and Upper Tenasserim, Lower Burma, and the Malay Peninsula on the other, is practically unknown to the naturalist, any contribution towards our knowledge of the insects inhabiting that region will be of use.

It may reasonably be inferred that insects occurring both in Assam and the Malay Peninsula would occur also in the intervening region, yet the proof that they do so has so far been wanting.

If I were asked to define Upper Burma, I would say that it is the plain (mostly alluvial) on either bank of the Irrawaddy, bounded on the west and north-west by the Aracan, Yomas, Lushai, and Chittagong hill tracts, on the north-east by Yunan and the Northern Shan States, on the east by the Shan States, and south-east by Karenni. It will be seen that I limit Upper Burma to a comparatively small tract of country; yet I think the definition a natural one. It is, in fact, an alluvial plain surrounded by mountainous country, the former being as hot and almost as dry as the Punjab. The

Shan States are essentially a hilly, or rather a mountainous, country; the usual trend of the hills being north and south, being the continuation southwards of the mountains of Junan. Four ranges of hills at least separate the plains of Burma from the Salwin River, having an average altitude from 4000 to 6000 ft. Many individual peaks rise to a much higher altitude, the highest I individually ascended being just under 10,000 ft., and some of the passes the troops crossed were over 6000 ft. in height. They are mostly composed of limestone and conglomerate, supporting a heavy forest, which, in the more inhabited parts of the country, is extensively burned by the Shans every cold weather, in order to secure a good crop of grass for the bullocks, which are universally used for carriage. At this time of the year long lines of fire extending from base to summit of the hills may be seen advancing, now slowly, now rapidly, with the wind; affording a magnificent spectacle at night, but limiting one's collecting rambles to the neighbourhood of the streams and moister jungles, which the fire is unable to reach. The toungya, or hill-cultivation, carried on by the hill-tribes is infinitely less injurious to the naturalist, as the trees on the space intended for cultivation are simply cut down and burned, the damage extending to a few acres instead of over several miles, as in the former case.

The intervening valleys lie at altitudes all considerably higher than the Burma plains. the lowest—that of Monè—being 800 ft., and that of Nyoungwè, in which is situated the Eulay Lake, 3000 ft. Lying north of the Monè Valley is that of Legya, which is perfectly flat and encircled by hills; and it does not require an examination of the fresh-water shells, which lie within a few inches of the surface of the ground, to be convinced that this once was the bottom of a sheet of water. The Monè Valley has the representative of the former lake, which probably filled the whole valley, in two very much smaller ones connected by a marsh, which extends some considerable distance round them.

On the other hand, though the northern end of the Nyoungwè Valley is now dry land, the southern end is an extensive lake, sixteen miles long by seven broad, which once extended up the whole valley. That this was so is proved both by geological evidence and also by tradition.

The reason for the gradual disappearance of the lakes is not far to seek, and is primarily due to the porosity of the limestone. Streams disappearing into extensive crevices and sometimes caverns of limestone are by no means infrequent in the Shan States. The best instance of this is that of the Nyoungwè (Eulay) Lake itself. This very considerable sheet of water is collected at its southern end into the Balu Choung, which flows at an elevation of about 3000 ft. in a south-easterly direction into Eastern Karenni. Here, after a course of some forty miles, mostly through an open plain, it enters a limestone gorge, and immediately at its exit opens out into a marsh, and disappears into the ground through holes and fissures in the limestone. Its further course is at present unknown, but it probably joins the Pan River some ten miles off, but flowing at a level of only 800 ft., and in this case the whole drainage of the lake must descend over 2000 ft. by an underground course.

The valleys of the Shan States are almost entirely devoted to rice culture, and in prosperous times continuous miles of country were under cultivation. But during the time I was there (1887–88) an entirely different state of things prevailed. For two years after the removal of Theebaw the Shan chiefs, who had previously paid some sort of allegiance to the Burmese monarchs, were left to themselves, and they signalised their emancipation by quarrelling among themselves to such an extent that the whole country was laid waste, villages and cattle destroyed, and many of the inhabitants fled to Lower Burma. Famine of course followed, and in the Legya Valley alone 2000 people were said to have died of hunger, and we saw their bones lying months afterwards in the main street of the town; the few surviving inhabitants having fallen into such a state of despondency that they were too apathetic to remove them. Under our rûle this state of things is happily fast disappearing, and in another year or two the Shan States will unquestionably become one of the largest rice-producing districts in our new province.

By far the greater number of the insects enumerated below came from Bernardmyo, Koni, or Fort Stedman; and a few words concerning these places will not be out of place. I am indebted to Surgeon Philson, M. S., for all the butterflies from Bernardmyo. I have never been

there myself, and can only say that it is an unhealthy hill station at an altitude of about 7000 ft. The country round about is mountainous and covered with thick forest, and I should certainly select this as my head-quarters if I had the good luck to spend a season collecting in the Shan States. It lies just north of the Ruby Mines, and can be reached without any difficulty from Mandalay.

Koni lies at an altitude of 4500 ft. in the centre of the Phwayla Plateau, and is close to the newly-made road leading from Meiktila in Upper Burma to the Shan States. The railway will also very possibly take the same route. The Phwayla Plateau is an extensive open down country, mostly under cultivation, but otherwise covered with short turf, bracken fern, and fir-trees (*Pinus longifolia*). The change from the dense forest lying between the Burma plains and this plateau is very remarkable. The former is essentially tropical; the latter reminds one immediately of the English South Downs. Such plateaux are not uncommon; they are to be met with in the interior of the Khasia and Jynteah hills, and one has lately been discovered at Haka, in the Chin country. Such plateaux look healthy enough, but Koni was dreadfully unhealthy on account of the fever, and has since been abandoned by British troops. Few butterflies are obtainable there, but Micros were very numerous, and I was fortunate enough to take several new to science.

Fort Stedman lies about thirty miles due east of Koni and Monè, the capital of the Shan States, almost due east of Fort Stedman, at a distance of a hundred miles. Fort Stedman is situated on rising ground close to the village of Maingsouk, on the eastern shore of the Eulay Lake. It is a lovely spot, and would that I had the good fortune to visit it once again. Immediately behind the fort rises the Sintoung range of hills, running up to 5000 ft., and everywhere covered with dense forest. The western shore is also enclosed by a lofty range of hills, everywhere intersected by deep ravines running up from the water's edge, and filled with dense jungle. The elevation is 3200 ft., and the flora is mostly tropical, though our experiments in growing English vegetables were surprisingly successful. The inhabitants are lake-dwellers, and spend the greater part of their lives on

the water in their dug-out canoes: their houses are built on piles, and pushed far out into the lake. In appearance they differ both from the Shans and Burmese; their dialect is also different, and they have a tradition that they came from the neighbourhood of Tavoy about two hundred years ago. The lake is now silting up very rapidly, both by the soil brought down by the streams in the rains, and also more particularly by the rapid growth of the water-weed. Possibly, in after generations, the remains of these lake-dwellers will excite as much interest and speculation as those of the Swiss lakes.

With regard to the climate of the Shan States: it is divided into the hot, wet, and dry seasons. The thermometer, of course, varies with the elevation. The hottest month is April, and at Fort Stedman it occasionally rose to 93° in the shade. Koni was several degrees cooler. The wettest months are August and September. The annual rainfall both at Koni and Fort Stedman was only about 34 in., but at Monè, away to the east, it was far heavier. Several showers fall in April, but the rains do not begin regularly until the middle of May, and continue until October; but there may be occasional showers until December, especially on the uplands. Of course, during the rains, travelling is objectionable, and, owing to there being no roads, it is almost impracticable. The climate otherwise cannot be complained of, and, taken all round, it is far better than most countries in the East.

I have incorporated with this catalogue the insects captured in Eastern Kareni during the military expedition for the subjugation of the Red Karen chief Sawlapaw. The majority were taken by my friend Captain Raikes, of the Rifle Brigade, to whom I handed over my net when I was incapacitated on account of a wound. No doubt the list might be very considerably extended by any one who, more fortunate than I, could devote more time to collecting. Entomology, during active service, can only be indulged in at odd moments.

My best thanks are due to Mr. Elwes for the immense trouble he took in looking over my captures (many of them "rags"), and comparing them with specimens in his magnificent collection. To Mr. de Nicéville also I

am under deep obligation, laying aside, as he did, his own heavy work to name my specimens.

NYMPHALIDÆ.

DANAINÆ.

1. *Danais aglea.*

A common insect throughout the rains, especially in June and July. It is more common at 3000 than at 5000 ft.

2. *Danais melaneus.*

Quite as common as the former at the same times and seasons.

3. *Danais liminace.*

Occurs commonly at an elevation of 3—4000 ft.

4. *Danais septentrionis.*

Quite the commonest of the hyaline Danaids, especially in the early rains.

5. *Danais chrysippus.*

Very common, but not nearly so abundant as in the plains of India.

6. *Danais genutia.*

More common than the last. It occurs up to 5000 ft., and very probably higher.

7. *Euplœa midamus.*

Occurs commonly everywhere. It is curious that I did not meet with *E. rhadamanthus*, which is common in Burma and Tenasserim. Neither have I seen *E. core.*

8. *Euplœa godartii.*

Three specimens at Fort Stedman, 3200 ft., on July 11th, 1887. I do not by any means infer from this that the insect is rare.

9. *Euplœa deione.*

Two specimens, both males, taken at an elevation of 1000 and 3200 ft. in a terai at the base of the Shan hills.

10. *Euplœa hopei.*

Two specimens; one, a male, from Bernardmyo, and the other, a female, from Pinyoung, 1000 ft., in the terai at the foot of the hills. It is evidently widely distributed.

SATYRINÆ.

11. *Mycalesis anaxias.*

One specimen in February near Thibaw.

12. *Mycalesis medus.*

Not a common insect in the Shan States, but common enough in Upper Burma. Mr. Elwes considers this the rainy season form of the next species, and my specimens of *medus* were taken in the rains.

13. *Mycalesis runeka.*

Not rare in the cold weather.

14. *Mycalesis perseus.*

'Butterflies of India,' vol. i., p. 120.

Very common. I have not the variety *visala*. My small series of eighteen specimens seem to show that specimens taken at the end of the rains are very much darker on the under side than those taken at the end of the dry weather. I have specimens taken at this time which are quite ochreous, with the discal band whitish. I believe a good series would show every intermediate shade, from dark plumbeous grey to pale ochreous, which would coincide with the rainy and dry seasons.

15. *Mycalesis mineus.*

A very common species, and varies much both in the size of the ocellus and depth of colouring.

16. *Mycalesis sanatana.*

One specimen from Bernardmyo.

17. *Mycalesis malsara.*

A common insect, as far as my experience goes.

18. *Lethe gulnihal*, de Nicéville.

P. Z. S., 1889, p. 450.

Three specimens, all males, from Bernardmyo, where it is very possibly not uncommon.

19. *Lethe sinorix.*

One male from Bernardmyo. It has the rufous margin on the hind wing well-marked.

20. *Lethe chandica.*

One male from Fort Stedman, taken in the rains.

21. *Lethe dyrta.*

Very common all the year round. I have a specimen from Sawlon, Eastern Karenni, twelve miles from the west bank of the Salween, which only differs from other specimens in being rather larger and brighter.

22. *Lethe rohria.*

A common species. I have taken it in the rains and at the commencement of the cold weather.

23. *Lethe verma.*

Two specimens from Bernardmyo. It seems partial to considerable elevations, as I did not take it either at Fort Stedman, 3200 ft., or Koni, 4500 ft.

24. *Neope bhima.*

Three specimens; two males and a female from Yatsouk and Bogeathat, at the north end of the Nyoungwè Valley. It is found in open scrub-jungle, where the trees are of medium size. It is fond of settling in the middle of the road, and then flying off into the jungle to settle on a tree-trunk, and is consequently difficult to catch. The male may be described as follows:—Fore wing uniform ochreous brown, with an obscure yellowish submarginal band; just internal to this are two black spots; one between the discoidal nervules, the other between the second and third median nervules; a faint yellowish spot on the costa between the cell and submarginal band. On the hind wing the

black oval spots are not so prominent as in the female. The under side of fore wing as in the female, but with no black spot below last ocellus.

25. *Orinoma damaris.*

One male from the neighbourhood of Bernardmyo.

26. *Yphthima newara.*

Five specimens of both sexes taken in the wet and dry seasons, one of which was taken in April on the Yatsouk Expedition.

27. *Yphthima philomela.*

Not uncommon and widely distributed.

28. *Yphthima methora.*

Several specimens from widely distant localities.

29. *Melanitis leda.*

Abundant at low elevations. They all vary extremely. I have a specimen from Karenni which is much smaller than the other specimens, and the ocelli on the upper side of the hind wing are marked by a white spot only. The form *ismene* also occurs.

30. *Elymnias undularis.*

I have never taken this in the Shan States, but have a specimen from the terai at the foot of the hills. In Eastern Karenni it was very common in January at 800 ft.

MORPHINÆ.

31. *Discophora tullia.*

A common species. The following is a description of the larva when full-fed:—Length, 2 in. Colour black, mottled with grey. A rather broad yellowish dorsal line; the junction of the segments marked by a thin irregular yellow line and red spot. Body covered with white hairs. Head and anus black, the former marked with perpendicular yellow lines. Lives during the day among three or four bamboo-leaves spun together. Pupa white, suspended by the tail; the labial palpi prominently pro-

jected, and changing to dark brown a few hours before emergence. It remains three weeks in pupa.

32. *Enispe cycnus.*

One male from Bernardmyo. I do not think that it has hitherto been recorded from so far east.

33. *Œmona lena.*

One male of this rare insect from Bernardmyo. I know nothing regarding its capture.

34. *Pareba vesta.*

Found not uncommonly at an elevation of 5000 ft., but it is a local insect in the Shan States.

NYMPHALINÆ.

35. *Ergolis merione.*

Found commonly at elevations from 1000—3000 ft., but less commonly from 3000—5000 ft.

36. *Ergolis ariadne.*

Quite a common species at suitable elevations.

37. *Eurytela horsfieldii.*

One specimen from Fort Stedman. It is now in Mr. Elwes' collection.

38. *Cupha erymanthis.*

A common species from 1000—3000 ft., more rarely at higher elevations. It is almost invariably found near water, and affects open spaces in thick jungle. It varies in colour from brownish ochreous to umber-brown, and, as far as my observation goes, this is not dependent on season or elevation.

39. *Atella sinha.*

Not a common species; taken at Yatsouk and Fort Stedman. I have a variety with the lower discal area pale yellow.

40. *Atella phalanta.*

Very common everywhere throughout the year.

41. *Cethosia cyane.*

A common species from 3000—5000 ft. The females emerge about three weeks after the males.

42. *Cethosia biblis.*

As common a species as the last, but does not extend to quite the same elevation.

43. *Cynthia erota.*

An abundant species ; generally found on bushes overhanging water, and fond of settling on damp sand. The females are much more rarely seen.

44. *Sephisa chandra.*

Occurs rarely at elevations of 3000 ft. I have never taken the female.

45. *Dilipa morgiana.*

I have two males taken by a soldier at Fort Stedman in July.

46. *Apatura parysatis.*

Not uncommon at 1000 ft., but I have never seen it above 3000 ft.

47. *Hestina nama.*

Very common all the year round. In the cold weather I have found it commonly on the tops of the limestone outcrops, which are so common in many places in the Shan States, and which rise to a height of 500 or 600 ft. above the surrounding plain. I have often observed that insects accumulate on the tops of hills, frequently on the extreme summits, more especially in the cold weather, when at lower elevations they are scarce or absent.

48. *Herona marathus.*

One specimen in August at Fort Stedman.

49. *Precis iphita.*

One of the most abundant butterflies, and found almost everywhere.

50. *Junonia asterie.*

51. *Junonia almana.*

Occur not uncommonly, but cannot be said to be abundant.

52. *Junonia atlites.*

Common at low elevations, more rarely at 4000 ft. It is common in Upper Burma, where the rainfall is heavy.

53. *Junonia lemonias.*

Very abundant everywhere. In the plains of Burma it is equally common.

54. *Junonia hierta.*

A very common butterfly, especially in the valleys at 800—1000 ft. It extends quite to the right bank of the Salween. It is also common on the Phwayla Plateau, 4500 ft.

55. *Junonia orithyia.*

Found in the same situations as the last, and quite as common, and, like it, much prefers open country to jungle.

56. *Neptis varmona.*

Everywhere abundant.

57. *Neptis ophiana.*

Not uncommon. I have one specimen which agrees with *N. columella*, Moore.

58. *Neptis aceris* var. *intermedia.*

Two specimens at Fort Stedman in June.

59. *Neptis soma.*

Very common. No doubt many more species of this genus occurs, and which I overlooked owing to their superficial resemblance when on the wing.

60. *Cirrhochroa aoris.*

A common insect, and doubtless to be found throughout the Shan States.

61. *Pseudergolis wedah.*

Not rare, and generally found in jungly places near water.

62. *Hypolimnas bolina.*

Very common in the later rainy months. Both the larger and smaller forms of both sexes occur commonly.

63. *Hypolimnas misippus.*

Not by any means so common as the last. The only females I have taken are the form *P. diocippus* of Cramer.

64. *Argynnis niphe.*

I found this commonly on the Phwayla Plateau; less commonly at Fort Stedman; but it occurs throughout the Shan States.

65. *Argynnis childreni.*

This species is apparently confined to high elevations, 7000 ft. and upwards. I have a series from Bernardmyo, 7500 ft., but from nowhere else.

66. *Parthenos gambrisius.*

Common at the end of the rains, and occurs from 3000 to 8000 ft.

67. *Limenitis danava.*

I think this must be an uncommon species. I had only one specimen, taken near water in thick jungle at Fort Stedman in August.

68. *Limenitis dudu.*

This is also a rare insect. I have one specimen, taken on the summit of a hill near Koni at an elevation of 5000 ft. at the latter end of October.

69. *Limenitis procris.*

Common everywhere in the Shan States; and I have a specimen from Sawlon, Eastern Karenni, taken in January.

70. *Athyma perius.*

Common everywhere.

71. *Athyma selenophora.*

Abundant everywhere.

72. *Athyma cama.*

I have found this rather an uncommon species at 3000—4000 ft.

The same remark applies to this genus as to *Neptis*. I have no doubt overlooked many species owing to their close resemblance.

73. *Symphædra dirtea.*

Extends throughout the Shan States at elevations of 800—3000 ft. I found it commonly in the Legya and Maingkain districts; also in Thebaw; and I have also a series which I took at Sawlon, on the banks of the Pun River, in January.

74. *Euthalia lepidea.*

I believe I have seen this on the Phwayla Plateau, but am not sure. My specimens come from Eastern Karenni, where it is not uncommon.

75. *Euthalia appiades.*

Somewhat local, but abundant where it occurs. I have it from Nankon, 4000 ft., on the edge of the thick belt of hills and forest extending between the Phwayla Plateau and the Upper Burma plains; also from the neighbourhood of Monè, and commonly from Eastern Karenni. It flies nearly all the year round.

76. *Euthalia lubentina.*

One specimen from Fort Stedman in July.

77. *Euthalia discispilota.*

One male taken in January at Sawlon.

78. *Euthalia garuda.*

An abundant species, especially at the edge of belts of forests. It is common also in Karenni.

79. *Pyrameis cardui.*

Not uncommon in the colder months at the higher elevations.

80. *Pyrameis indica.*

One specimen from Bernardmyo. It is probably not uncommon at high elevations.

81. *Vanessa canace.*

Not uncommon, and widely distributed throughout the Shan States. I have specimens from Fort Stedman, Monè, and also from Swélin in South Theinee.

82. *Symbrenthia hippoclus.*

An abundant species everywhere.

83. *Rhinopalpa vasuki*, Doherty.

I have several specimens taken in widely different localities. It is common in Eastern Karenni, also in the forest belt between Burma and the Shan States, and appears partial to thick jungle near water. I have taken it in July and also in January.

84. *Cyrestis thyodamas.*

A widely-distributed species. It occurred on the Yatsouk Expedition, at Fort Stedman, and in Eastern Karenni.

85. *Cyrestis cocles.*

Occurs in Eastern Karenni. Though I have never seen it in the Shan States, yet it probably occurs.

86. *Cyrestis rahria.*

This occurs in Eastern Karenni, but whether commonly or not I cannot say. I have not seen it in the Shan States. My three specimens are tattered, but quite sufficient to identify the species.

87. *Kalluna inachus.*

A common species in the later rainy months.

88. *Doleschallia polibete.*

An uncommon species at 3000—5000 ft.

89. *Charaxes eudamippus.*

I have taken this at Singu, 1200 ft., a military post in the forest between Fort Stedman and Hlinedet. It is probably not uncommon, though I have only one or two specimens.

90. *Charaxes athamas.*

Occurs commonly all the year round throughout the Shan hills and Karenni.

91. *Charaxes arja.*

Quite as common as the last, and found in the same localities.

92. *Charaxes fabius.*

I think this species must be rare. I have only one specimen, which I took in December at an elevation of 5000 ft., at the bottom of the Hopaung Valley, south-east of Fort Stedman.

93. *Charaxes aristogiton.*

One specimen brought to me by a soldier at Fort Stedman.

LEMONIIDÆ.

LYBITHÆINÆ.

94. *Libythea myrrha.*

I have taken this in most of the valleys of the Shan States in the Meigupon, Legya, and Monè valleys; it is quite common.

NEMEOBIINÆ.

95. *Zemeros flegyas.*

Abundant throughout the country.

96. *Dodona ouida.*

Widely distributed. I have taken it in both the Northern and Southern Shan States.

97. *Abisara fylla.*

Widely distributed. I have specimens from Bernardmyo, as well as from localities in the Southern Shan States.

98. *Abisara neophron.*

This, I think, is more common in the Northern and Central States; in fact, I have never taken it either at Fort Stedman or Koni, but have specimens which I took at Banzam and Thebaw in the cold weather.

99. *Abisara* sp. ?.

De Nicéville, writing of the last six species of *Abisara*, 'Butterflies of India,' vol. ii., states that if the locality is known the specimen can be named. This being the case, and specimens from the Shan States not having been previously examined, it is difficult to name my specimens, some of which also come from Eastern Karenni. They all vary, but are probably varieties of *P. echerius* of Stoll.

LYCÆNIDÆ.

100. *Loxura atymnus.*

A very common species throughout the country. It has a short weak flight, and frequently settles in the middle of thick brushwood. It is consequently difficult to secure good specimens.

101. *Gerydus* (*Miletus*) *boisduvali.*

A common species, usually found in the shade of large trees.

102. *Paragerydus horsfeldi.*

This is found in the same localities as the last; it is equally common, the specimens varying greatly in size.

103. *Allotinus multistrigatus.*

Not rare and widely distributed.

104. *Logania marmorata.*

Two specimens at Monè in the cold weather.

105. *Poritia phraatica.*

One specimen in March at Phaseing in Thebaw.

106. *Pithecops hylax.*

A common species in thick jungle, both in the Shan States and in Karenni.

107. *Cyaniris chennellii.*

Occurred, but not commonly, both at Koni and Fort Stedman.

108. *Cyaniris placida.*

I have one male only, taken at Monè in January.

109. *Cyaniris jyntcana.*

I have this from nowhere else than Bernardmyo.

110. *Zizera sangra.*

Occurs on the open hilly country about Koni; not commonly.

111. *Zizera gaika.*

Scarce at Fort Stedman, and I have not found it elsewhere.

112. *Lycæna maha.*

A common species found on open hill-sides from 3000—5000 ft.

113. *Lycæna plinius.*

Very abundant everywhere.

114. *Lycæna theophrastus.*

Occurs at Koni, and no doubt elsewhere.

115. *Lycæna bœtica.*

Found everywhere in the Shan States, and at all elevations. The species is very constant.

116. *Lycæna parrhasius.*

Very common at low elevations.

117. *Lycæna argiades.*

Occurs at higher elevations than the last, and is equally common.

118. *Lycæna putli.*

Widely distributed and abundant.

119. *Jamides bochus.*

Occurs throughout the Shan States, and also in Karenni.

120. *Talicada myseus.*

Common at Yatsouk and at Koni. In fact, it is widely distributed, and, where found, very common.

121. *Lampides elpis.*

Very common at 3000—5000 ft.

122. *Lampides alexis.*

Not so common as the last, and found at lower elevations, as at Monè, 800 ft.

123. *Catachrysops strabo.*

Abundant everywhere.

124. *Catachrysops cnejus.*

Abundant everywhere.

125. *Castalius decidea.*

A common species, and found throughout the summer.

126. *Castalius roxus.*

Found in the same localities as the next species.

127. *Castalius rosimon.*

Commonly at Fort Stedman and Koni.

128. *Nacaduba atrata.*

A few specimens only, taken at Koni in the summer.

129. *Nacaduba ardates.*

Very common in the sandy beds of streams at moderate elevations.

130. *Nacaduba hampsonii.*

Occurred at Fort Stedman, but rarely.

131. *Aphnæus lohita.*

Occurs commonly all the year round both in the Shan States and Upper Burma.

132. *Aphnæus syama.*

The only specimens I have are from Koni, but it probably occurs elsewhere.

133. *Iolaus illurgis.*

I have one specimen of this rare insect, which I took near Koni, 5000 ft. It is a perfect specimen, and a very lovely insect.

134. *Sithon sugriva.*

This, I think, must be rare, as I have only one specimen, which I took in July at Fort Stedman.

135. *Camena ctesia.*

Probably a scarce insect; I have only one specimen, a male, taken at Liseing in the cold weather.

136. *Camena deva.*

Widely distributed and common on the extreme summit of isolated hills all the year round, 4000—6000 ft. The female is much more rarely met with than the male.

137. *Cheritra freja.*

Very common in Upper Burma, the Shan States, and Eastern Karenni.

138. *Hypolycæna erylus.*

I have only two specimens, taken at Maingyi, on the borders of South Theinee, in the cold weather.

139. *Hypolycæna kina.*

My one specimen came from Bernardmyo, in the Northern Shan States.

140. *Hypolycæna lisias.*

Occurs at Singu, 2000 ft., where I took two specimens in the rains; but I have not met with it elsewhere.

141. *Drupadia boisduvalii.*

Occurs not uncommonly throughout the country.

142. *Lehera eryx.*

One specimen at Yatsouk in April, at about 2000 ft. elevation.

143. *Zinaspa distorta.*

A few specimens from Koni. I fancy, however, that it is not an uncommon insect.

144. *Rapala nissa.*

Common and widely distributed, and very partial to the summits of hills at 5000 ft. elevation.

145. *Rapala jarbas.*

This is also a widely distributed species, and I have specimens both from the Northern and Southern Shan States.

146. *Iraota mæcenas.*

Apparently rare. I have only taken it at Monè in the cold weather.

147. *Chrysophanus mandersi*, Elwes, n. sp.

Mr. Elwes, in whose collection the specimen now is, has named and described it as follows:—"Like *C. Pang*, Oberthür, Et. Ent., xi. Liv., p. 19, t. v., fig. 16, but the band of black spots hardly showing through the fore wing. Below the difference is well-marked on the fore wing. The outer row of spots (which, like those of *C. Pang*, are black edged with blue inside, except the discal ones, which are ringed with blue) does not extend to the costa; the next row is parallel to the outer one, not directed inwards, as in *Pang*; the third and innermost discal spot is absent On the hind wing the transverse white band is only represented by a faint trace of spots. The interspaces are not red, and the black spots near the base not ringed with white.

"Nearly allied to *C. Pang*, of which I have two specimens from M. Oberthür, taken at or near Tatsienlo in East Thibet, many hundred miles to the northward. The occurrence of this insect, which belongs to a genus hitherto unknown in the Eastern Himalaya or Malay region, is remarkable, especially when the elevation and the season of its capture is considered."

My specimen was taken at Banzam, 3400 ft., in February, and is a male.

148. *Ilerda epicles.*

Widely distributed, but not, I think, abundant.

149. *Ilerda brahma.*

Two specimens from Bernardmyo, but nowhere else.

150. *Curetis brelis.*

Everywhere abundant.

151. *Acesina aberrans*, de Nicéville.

One female at Koni. It is probably, however, not uncommon.

152. *Amblypodia amantes.*

Occurs at Fort Stedman and elsewhere at low elevations.

153. *Amblypodia eumolphus.*

Widely distributed and common, 4000—8000 ft. It is on the wing all the year round. It is a very pugnacious insect, and soon tatters itself.

154. *Amblypodia anita.*

I have only one specimen, taken in the cold weather at Monè.

155. *Amblypodia fulgida.*

Not uncommon at Koni during the summer months.

156. *Amblypodia atrax.*

A rare species, which I have only taken east of Fort Stedman.

157. *Amblypodia* (*Surendra*) *quercetorum.*

A common species almost everywhere.

158. *Amblypodia* (*Surendra*) *latimargo* (Moore).

I have one specimen, a female, from Koni, in September. It agrees in every respect with specimens in the British Museum.

159. *Amblypodia rama.*

Quite common at Koni and elsewhere.

PAPILIONIDÆ.

PIERINÆ.

160. *Pontia xiphia.*

Common all the year, both in Upper Burma and the Shan States.

161. *Delias pasithoe.*

Common nearly all the year round. I have found it up to 5000 ft.

162. *Delias descombesi.*

Very common everywhere, and found at the same elevations as the last.

163. *Delias hierte.*

Not uncommon, and occurs also in Eastern Karenni.

164. *Delias agostina.*

Widely distributed at low elevations. In the Monè Valley it is abundant.

165. *Delias belladonna* var. *horsfeldii.*

I have one female specimen from Koni, 4500 ft., which has the abdominal margin brilliantly yellow. It is most unfortunate that I was unaware of the vexed question concerning the three supposed species, *belladonna*, *horsfeldii*, and *ithiela;* otherwise I might have done something towards settling it by collecting a large number of specimens.

166. *Prioneris thestylis.*

I have specimens from Fort Stedman and Bernardmyo. My female specimens are mimics of the above, but the yellow on the abdominal margin is not so well-marked.

167. *Prioneris clemanthe* var. *Watsoni.*

Not taken in the Shan States, and but rarely in Karenni.

168. *Catopsilia pyranthe.*

Abundant all over the country at all elevations.

169. *Catopsilia catilla.*

The most abundant of the *Pierinæ*, and found everywhere.

170. *Catopsilia jugurthina.*

Widely distributed at low elevations.

171 *Terias hecabe.*

An abundant insect everywhere. My specimens tend to bear out Mr. Elwes' statements regarding the numberless described species being merely seasonal varieties of the same species.

172. *Terias senna.*

Not uncommon at Koni. It varies greatly in size,

some of my specimens being quite half an inch smaller than others.

173. *Gonepteryx himalayensis.*

I took a few specimens at Pindea, seven miles north of Phwayla, on the plateau, in April; and again commonly at Koni in September. The elevation, 4000—4500 ft., appears remarkably low.

174. *Colias Fieldi.*

Abundant at Bernardmyo, and seen on the summit of Swélin, 10,000 ft., in South Theinee, in February.

175. *Pieris canidia.*

I have taken this in April, when on the Jatsouk Expedition, and in August at Fort Stedman, 3000 ft.

176. *Pieris melete.*

I have two males and a female from Bernardmyo. Unfortunately I do not know the date of capture.

177. *Pieris rama.*

Very common nearly all the year round in gardens and cultivated ground. I have one very diminutive female, which reminds one of the small form of the female *P. napi.*

178. *Tachyris paulina.*

This is rare at Fort Stedman, but common in the Monè Valley, in April. It is fond of settling on damp spots on the roadside, and dashing off into the jungle when disturbed.

179. *Tachyris lalage.*

Common at 3000 ft.

180. *Tachyris hippo.*

I have three males and one female from Sawlon, but I have not taken it in the Shan States.

181. *Huphina hira.*

Widely distributed and common.

182. *Eronia hippia.*

Widely distributed. I have it from the plains of Upper Burma, and from intervening places between them and Monè. It is found more abundantly at low elevations.

183. *Hebomoia glaucippe.*

Occurs commonly all over the Shan States. Its resemblance to a withered leaf when settled on wet mud is exact. The upper wings are folded so closely behind the lower that only the pointed tips project, forming, as it were, the end of the leaf; while the speckled hind wings with the fuscous discal line form the base and midrib to perfection.

184. *Ixias pyrene.*

Common everywhere, but is more abundant in the Burma plains.

PAPILIONINÆ.

185. *Ornithoptera rhadamanthus.*

Very common in the low valleys, 800—3000 ft.

186. *Papilio aidoneus.*

Not an uncommon species. It is fond of the deep shade of forest trees overhanging streams, under which it flies with a slow graceful flight.

187. *Papilio philoxenus.*

Abundant and widely distributed.

188. *Papilio aristolochiæ.*

Very common, but not found, I think, above 5000 ft.

189. *Papilio paris.*

A common species everywhere; also in Karenni.

190. *Papilio rhetenor.*

Apparently an uncommon species, as I have only taken it at Fort Stedman in October.

191. *Papilio helenus.*

Abundant. Difficult to secure in good condition, as it has a habit of flying in and out of bushes, and soon tatters itself.

192. *Papilio chaon.*

Not so common as the last, but found in the same localities.

193. *Papilio polytes.*

Very common almost everywhere.

194. *Papilio erithonius.*

Very common, especially at low elevations. It also occurs in Karenni. All my specimens are smaller than those taken in the Punjab.

195. *Papilio clytia.*

A common species at low elevations. The dark form *panope* also occurs.

196. *Papilio antiorates.*

Common in low valleys, 800—1200 ft., in March and April, and again at the commencement of the cold weather. It occurs at Nasailing, in South Theinee.

197. *Papilio sarpedon.*

Abundant and very partial to damp places. It rejoices in the hottest sunshine, and is commonest at elevations of 3000 ft.

198. *Papilio bathycles.*

Very common, but I have never seen the female.

199. *Papilio machaon.*

Not uncommon at 4000 ft., more rarely at 3000 ft.

200. *Leptocircus curcus.*

This is a most interesting and curious butterfly, and would scarcely be taken for such when seen for the first time hovering over a pool of water; when it certainly has much more resemblance to a dragon-fly. It is not

by any means rare at low elevations in the moister valleys.

HESPERIDÆ.

201. *Badamia exclamationis.*

Occurs commonly throughout the Shan States.

202. *Ismene Benjamini.*

Widely distributed and common.

203. *Ismene jaina.*

The males are not uncommon, but I have not seen the female.

204. *Hasora chromus.*

Common during the rains.

205. *Pithauria murdava.*

Not uncommon during the rains at 3000 ft.

206. *Baoris oceia.*

Not uncommon, but varies considerably both in size and in the number of spots on the fore wing.

207. *Parnara toona.*

Probably not uncommon. No doubt many other species of *Parnara* occur, which I overlooked owing to their close similarity.

208. *Sarangesa dasahara.*

Very common and widely distributed both in the Southern and Northern Shan States.

209. *Telicota bambusæ.*

Not uncommon, but local, as far as my experience goes.

210. *Telicota augias.*

Not uncommon. It seems to prefer the open down country at 4000—5000 ft., whereas *T. bambusæ* I have generally found on the outskirts of thick jungle.

211. *Telicota dara.*

Abundant everywhere.

212. *Halpe zema.*

A few males taken in the dry season at Fort Stedman.

213. *Halpe dolopia.*

A few specimens from Fort Stedman in the dry season.

214. *Tagiades menaka.*

A common species; fond of the neighbourhood of water, and settling on dark-coloured rocks, thereby rendering the white hind wings very conspicuous.

215. *Tagiades mætana* (Moore).

One female from Fort Stedman.

216. *Antigonus sura.*

A very common and widely distributed species.

217. *Coladenia dan.*

Very common at 3000 ft., and widely distributed.

218. *Udaspes folus.*

Common in light jungle.

219. *Udaspes restricta.*

One specimen in June at Fort Stedman, but it is probably not uncommon.

220. *Plesioneura aurivittata.*

Very common at low elevations in light jungle, and very widely distributed.

221. *Astictopterus diocles.*

Common and widely distributed.

222. *Astictopterus olivescens* (Moore).

Rare at Fort Stedman in the rains.

223. *Astictopterus salsala.*

Widely distributed at low elevations.

224. *Baracus septentrionum.*

I have two specimens from Fort Stedman. It is, I think, not uncommon, and seems partial to open spaces covered with long grass.

Addenda.

225. *Abaratha agama.*

A few specimens at Fort Stedman in the rains.

226. *Thanaos obsoleta* (Moore).

I have lost the locality for this insect. It is, however, not uncommon.

227. *Pyrgus superna* (Moore).

A few specimens at 1000 ft. in the middle of March.

228. *Hesperia oecia.*

Common at Fort Stedman in September.

XVI. *Notes on the species of the families* Lycidæ *and* Lampyridæ, *contained in the Imperial Museum of Calcutta, with descriptions of new species, and a list of the species at present described from India.* By the Rev. Henry S. Gorham, F.Z.S., F.E.S.

[Read June 4th, 1890.]

The species of the family *Telephoridæ* contained in this collection have been noticed by me in the 'Proceedings' of the Zoological Society for 1889 [pt. ii., p. 96]. Of the two families of which this paper treats, species have been described by Mr. C. O. Waterhouse, M. E. Bourgeois, and myself from various parts of the East; and I have thought it would be useful if I gave a complete *résumé* of the *Indian* species, so far as they are at present known. That our knowledge of the coleopterous fauna of our Indian Empire is in many groups so very limited seems almost a reproach to us. It is much to the credit of the authorities of the Calcutta Museum that they have determined to inaugurate a better state of things.

In the following notes I have given the actual habitat of the specimens recorded, whenever I can ascertain it. The letters B. M. indicate that the species is contained in the British Museum; G., that the specimens referred to are in my own collection. Mus. Brus., Mus. Gen., refer to specimens contained in the Museums of Brussels and Genoa, sent to me for determination.

Group MALACODERMATA.

Family LYCIDÆ.

Gen. 1. Macrolycus, *Waterhouse.*

1. *Macrolycus bowringii*, Waterh.

Allahabad (B. M.).

Gen. 2. Calochromus, *Guérin.*

1. *Calochromus orbatus*, Waterh.

Darjeeling (B. M., Mus. Calc., Dr. Anderson, ♂?); Assam, Sibsaugor, Andaman Isles.

The specimens with long antennæ appear to be females. This species, according to Mr. Waterhouse, occurs also in the Philippine Isles.

3. *Calochromus apicalis*, Hope.

Nepal (B. M.).

4. *Calochromus rugatus*, Waterh.

Allahabad (B. M.).

5. *Calochromus ruber*, Waterh.

Allahabad (B. M.), Madras (coll. G.), Singapore (G.).

6. *Calochromus* sp.

Very like *C. ruber;* perhaps not distinct. Dibru (G.).

7. *Calochromus velutinus*, Waterh.

Burmah (B. M.).

8. *Calochromus tarsalis*, Waterh.

India (B. M.).

9. *Calochromus* sp.

India (G.).

A large species of similar size and appearance to *M. bowringii*.

Gen. 3. Lycostomus, *Motschulsky*.

1. *Lycostomus similis*, Hope.

Nepal, Allahabad, Siam, Ceylon, Bootan (B. M.); Sahibg., Sikkim, Naga Hills, Assam, Andaman Isles, S. India (Mus. Calc.).

2. *Lycostomus thoracicus*, Waterh.

Bootan, Sikkim, Darjeeling (B. M.); Cherra (Mus. Calc.).

3. *Lycostomus* sp.

Mount Kodeicanel (Castets).

Allied to *L. thoracicus*.

4. *Lycostomus præustus*, Fab.

Assam, Madras (Mus. Calc.).

5. *Lycostomus analis*, Dalm.

Dacca, N. Bengal, Ceylon (B. M.).

Near *L. præustus*, and also allied to *L. internexus*, Walker, from Ceylon.

6. *Lycostomus modestus*, Waterh.

Bootan (B. M.), Kullu, Assam, Sibsaugor, Fista Valley (Mus. Calc.).

7. *Lycostomus ambiguus*, Waterh.

Cachar (B. M.).

8. *Lycostomus singularis*, Waterh.

S. India (B. M.).

9. *Lycostomus rufiventris*, Waterh.

Burmah (B. M.).

10. *Lycostomus striatus*, Waterh.

India.

11. *Lycostomus* sp. ?.

India (G.).

Near *debilis*, Waterh., a Chinese species.

Gen. 4. Lyponia, *Waterhouse*.

1. *Lyponia waterhousei*, n. sp.

Niger, thorace subnitido, disco excepto, rufo angulis posticis rectis, elytris lateribus, apicem versus paululum latioribus; antennis corporis fere longitudine. Long. 12—14 mm., ♂ ♀.

Hab. India (Mus. Calcutta, ♀ Mus. Gorham).

The antennæ in this species are formed as in *L. quadricollis*, a Japanese species (of which a figure will be found in the Trans. Ent. Soc. Lond., 1883, t. 17, f. 5 and 6), excepting that those of the female are nearly of the same length as those of the male, and the fourth to the tenth joints are much more developed than in the female of *L. quadricollis*, being widely triangular, and becoming more acutely serrate as they approach the apex. The thorax is wider than in that species, the entire margin elevated, the anterior angles rounded, the sides a little contracted to the hind angles, but not so much so as to prevent those angles being right angles; the thorax is brick-red, with only the disk either infuscate or with a

square pitchy-black patch; the elytra are pale brick-red, the costæ (nine in number) very even; the scutellum is black, rather long.

This insect is also allied to *L. debilis*, Waterh., a species from China, but differs from it in not having the alternate costæ raised. It has long been known to me from a female specimen in my own collection: there are three male and one female specimens. Probably from the N. E. frontier, in the Calcutta Museum, and I have seen one in the British Museum.

2. *Lyponia* sp. ?.

A single female specimen in the Mus. Calc., of a distinct species, smaller, with the thorax rufous only at the sides, and shorter and scarcely serrate antennæ.

Gen. 5. Plateros, *Bourgeois*.

1. *Plateros dispellens*, Walker.

South India, Ceylon (B. M.).

2. *Plateros languidus*, C. Waterh.

Ceylon (B. M.), Andaman Isles (Mus. Calc.).

3. *Plateros fuscicornis*, n. sp.

Pallide ochraceus, abdomine, antennis, tibiis, tarsisque fuscis prothorace oblongo-quadrato, disco utrinque foveolato. Long. 9—11 mm., ♂ ♀.

Hab. Andaman Isles (Mus. Calc.).

The head, thorax, elytra, scutellum, femora, body beneath (except the abdomen), and the basal joint of the antennæ in part, are pale ochraceous yellow. The striæ of the elytra are quite even, and the very short scaly pubescence almost conceals the punctures. The thorax is shining: in addition to the rather deep but wide channel there is a transverse impression behind the frontal carina, and a very distinct, round, almost punctiform, fovea on each side. The legs are rather indeterminate in colour, being yellow at the base, and become fuscous at the tarsi.

Several specimens.

This is very near *P. languidus*, but much larger.

4. *Plateros fuscipennis*, Waterh.

Sylhet (B. M.).

5. *Plateros carbonarius*, Waterhouse.

Gen. 6. Xylobanus, *Waterhouse.*

1. *Xylobanus gratiosus*, Waterhouse.

Andaman Isles (Mus. Calc., B. M.).

Varies a good deal in size and somewhat in colour; two examples in my own collection are broader and redder than those in the Calcutta Museum.

Gen. 7. Metriorrhynchus, *Guérin.*

1. *Metriorrhynchus sericeus*, Waterhouse.

India (coll. Gorham), Sumatra (Leyden), Java (B. M.).

Var. apice infuscato. India (B. M.).

2. *Metriorrhynchus sericans*, Waterhouse.

India (B. M.).

3. *Metriorrhynchus lineatus*, Hope, in Gray, Zool. Misc.

India, Nepal (B. M.), Sikkim (Mus. Calc.), Coimbator (B. M.).

Var. A, Waterhouse. Allahabad (B. M.).

Var. B. Ceylon.

4. *Metriorrhynchus rubicundus*, Waterhouse.

Sylhet (B. M.).

Gen. 8. Conderis, *Waterhouse.*

1. *Conderis signicollis*, Waterhouse ?.

Assam, Sibsaugor (Mus. Calc.).

Gen. 9. —— —?.

A single example of a species of a genus allied to *Metriorrhynchus*, but having but a single cell in the centre of the disk of the thorax.

Andaman Isles.

Gen. 10. Eros, *Newman.*

1. *Eros* sp. ?.

A single specimen. India.

Gen. 11. ——— ?.

Allied to *Plateros*, but with pectinate antennæ in the male.

1. ——— sp.

Of the size and in colour like *P. languidus*. Luteous, with the antennæ, tibiæ, tarsi, and elytra infuscate.

Andaman Isles.

Family LAMPYRIDÆ.

Gen. 1. Vesta, *Laporte*.

1. *Vesta saturnalis*, Gorham, Trans. Ent. Soc. Lond., 1880, p. 13.

Naga Hills, 5000 ft. alt., Khasia Hills (Mus. G.); Sikkim, Sibsaugor in Assam (Mus. Calc.).

Gen. 2. Alecton, *Laporte* (cf. *Pyrocœlia*).

Genus 3. Lamprophorus, *Gemminger & Harold*.

1. *Lamprophorus tenebrosus*, Walker.

India (G.), Pondicherry (Mus. Brus., G.), Ceylon (B. M.).

2. *Lamprophorus crassus*, Gorham, Trans. Ent. Soc. Lond. 1880, p. 88.

Pondicherry (Mus. Brus.).

3. *Lamprophorus nepalensis*, Gray, Zool. Misc., p. 26.

Nepal (B. M.); Sikkim, Khasia Hills (Mus. Calc.); Assam Plains (G.).

4. *Lamprophorus diffinis*, Walker.

Ceylon.

5. *Lamprophorus minor*, Olivier.

Burmah.

Gen. 4. Diaphanes, *Motschulsky*.

1. *Diaphanes indicus*, Mots., Et. Ent., iii., 15.

India (Mus. Brus.); Assam, Sibsaugor (Mus. Calc.).

2. *Diaphanes limbatus*, Gorham, Trans. Ent. Soc. Lond., 1880, p. 90.

India (G.).

3. *Diaphanes planus*, n. sp.

Pallide ochraceus; corpore subtus, antennis, pedibus alisque fuscis. Long. 17 mm., ♂.

Hab. India ?, Dr. J. Anderson (Mus. Calc.).

Of the same size, colour, and general appearance as *Pyrocœlia bicolor*, Fab.; the thorax, however, is longer and more evenly rounded in front, and possesses the usual diaphanous area; the front margin is gently and evenly elevated, the sides less so. The hind margin is concave (as usual in this genus), so that the hind angles seem a little produced. The centre of the disc is very finely carinate.

Two specimens.

4. *Diaphanes guttatus*, Gorham, Trans. Ent. Soc. Lond., 1880, p. 90.

Bengal (Mus. Brus.).

Gen. 5. Phœnopyrus, *E. Olivier.*

1. *Phœnopyrus birmanensis*, Olivier, Ann. Mus. Civ. de Genes., p. 347, 1885, t. 5, f. 1.

Burmah, Minhla (Mus. Gen.).

I have not seen this.

Gen. 6. Pyrocœlia, *Gorham.*

1. *Pyrocœlia foochowensis*, Gorham, Trans. Ent. Soc. Lond., 1880, p. 93.

China, Foochow (G., B. M.); Burmah, Minhla (Mus. Gen. sec. E. Olivier).

2. *Pyrocœlia terminata*, Gorham, Trans. Ent. Soc. Lond., 1880, p. 92.

India (G.), Sumatra (Mus. Gen. sec. E. Olivier).

3. *Pyrocœlia lateralis*, Gorham, Trans. Ent. Soc. Lond., 1880, p. 92.

Ceylon (G.), Java (Mus. Leyden), Sumatra (Mus. Gen. sec. E. Olivier).

4. [*Pyrocœlia plagiata*, Gorham, *l. c.*, p. 93.]

Java (Mus. Leyden, E. Olivier, R. Oberthür).

The occurrence of this in India needs confirmation.

5. [*Pyrocœlia fumigata*, Gorham, *l. c.*, p. 93.]

Malacca, Siam (G.), Sumatra (Mus. Leyden), Johore, Motiram (Mus. Calc.).

7. *Pyrocœlia lacordairei*, E. Olivier, Rev. d'Ent., 1883, p. 327. Notes from the Leyden Mus., 1886.

Alecton indicus, Chev., *in litt.* Lac. Gen. Atlas.

Bengal.

M. E. Olivier has shown that this is not congeneric with *Alecton discoidalis*, as might have been anticipated, seeing that is a Cuban insect, but that it is a *Pyrocœlia*. The species of this latter genus appear to have a very extended distribution in the East.

Gen. 7. Luciola, *Laporte*.

1. *Luciola vespertina*, Fab., Syst. Et., ii., p. 103; Gorham, Trans. Ent. Soc. Lond., 1880, p. 100; E. Olivier, Ann. Mus. Civ. de Gen., p. 359, 1885 (*L. chinensis*, L.).

India, Assam (G.), Sibsaugor (Mus. Calc.), Tenasserim (Mus. Calc.).

2. *Luciola substriata*, Gorham, Trans. Ent. Soc. Lond., 1880, p. 100.

S. India, Madras, Bombay, Bengal (Mus. Brus.); Borneo, Java (Mus. Leyden); Ceylon (Mus. Gen. sec. E. Olivier).

M. Olivier does not agree with me in separating this. I remark, however, that as all the specimens he had seen, and which all appear to come from Ceylon, are of one type, he can hardly have seen the larger wide forms from Northern India, &c.; and I still think it will prove to be a valid distinction.

3. *Luciola gorhami*, Ritsema, Notes from Mus. Leyden, v., p. 4.

Luciola affinis, Gorh., *l. c.*, p. 101, *nec* Ritsema.

Madras, Bombay, Bengal (Mus. Brus.); Calcutta (Mus. Calc.).

4. *Luciola malaccæ*, Gorham, Trans. Ent. Soc. Lond., 1880, p. 101.

India, Madras (G.); Malacca.

5. *Luciola semilimbata*, E. Olivier, Rev. d'Ent., 1883, ii., 75.

India.

Unknown to me.

6. *Luciola ovalis*, Hope, in Gray's Zool. Misc., 1831.

Luciola circumdata, Mots., Et. Ent., 1854, p. 50.

India (Hudd, G.), Assam (Mus. Brus., B. M.), Sibsaugor (Mus. Calc.), Burmah, Minhla (Mus. Gen. sec. E. Oliv.), Sumatra (Mus. Leyden).

This curious and distinct species was well described by Hope.

7. *Luciola indica*, Mots., Etud. Ent., iii., p. 53.

India (G.), Bombay (Mus. Brus.), Andaman Isles (G.).

8. *Luciola xanthura*, Gorham, Trans. Ent. Soc. Lond., 1880, p. 103.

India, Neilgherry Hills (Mus. Brus.).

9. *Luciola insularis*, E. Olivier, Rev. d'Ent., ii., p. 328.

Andaman Isles (Mus. Calc.).

I have identified a species, of which there are several specimens in the Calcutta Museum, with this, but with a good deal of doubt.

10. *Luciola* sp. ?.

Assam, Sibsaugor (Mus. Calc.).

Two specimens of a *Luciola*, with fuscous elytra narrowly margined and the disc of the thorax infuscate, cannot at present be determined.

11. *Luciola testacea*, Mots., Etud. Ent., 1854, p. 48; E. Olivier, Ann. Mus. Civ. de Genes., 1885, p. 357.

M. Ernest Olivier has identified a species from Borneo, Sarawak, with this. Motschulsky's description is vague, as his also his 'Indes Orientales.'

Gen. 8. Dioptoma, *Pascoe.*

1. *Dioptoma adamsi*, Pasc., Journ. of Ent., 1860, p. 118, t. 5, f. 2.

India, Madras (G.) ; Dacca.

Gen. 9. Ochotyra, *Pascoe.*

1. *Ochotyra semiusta*, Pasc., *l. c.*, 1862, p. 323, t. 16, f. 7.

India, Malabar (Pascoe) ; China, Foochow (G.).

XVII. *On some new species of African diurnal Lepidoptera.*

By Philip Crowley, F.L.S., F.Z.S., &c.

[Read August 6th, 1890.]

Plates XVII. & XVIII.

Mylothris subfusa, sp. n. (Pl. XVIII., fig. 3).

♂. Fore wing nearest to *T. Bernice* of Hewitson, but differing in the extent of the black apical portion, which is much wider; there is no black spot at the end of the submedian nervure and the first medial nervule; the grey dusting at the base of the wing is much lighter and does not extend so far as in *T. Bernice*. Hind wing has the hind marginal border much broader and darker, there being three large distinct black spots, one on the second subcostal nervule, one on the first radial nervule, and the third on the third median nervule; there are three more spots on the hind margin, but they run together, making a complete black border towards the anal angle. Under side of fore wing is very similar to the upper surface, the black at the apex being very distinctly marked; there is only a slight indication of black along the costa; the base of fore wing is yellow. Under side of hind wing: the hind wing has a complete broad black border on the hind margin, commencing a little above the second subcostal nervule and extending below the submedian nervure. Nearly the whole of the basal area is suffused with yellow, and costa strongly marked with same. The ♂ of this species is closely allied to *T. Bernice*, but is distinguished by the breadth of the black hind margin. Exp. 2¼ in.

Hab. Cameroons. In coll. Crowley.

♀. The female (Pl. XVIII., fig. 4) is similar to that of *T. Bernice*, but in the fore wing it differs in the larger extent of grey above the submedian nervure; the hind margin and apex are also much darker. Hind wing dusky brown, with the hind marginal border rather distinctly marked. Under side of fore wing is almost white, with the apex black, and four black spots, one at the end of each nervule from the second discoidal, or radial nervule to the first median nervule; they are all slightly tinted with yellow; base yellow. Under side of hind wing is paler than on the upper surface,

being dingy white, the greater part being tinged with yellow; the black border near the hind margin is very broad and strongly marked. Exp. 2¼ in.

Hab. Cameroons. In coll. Crowley.

Hypolimnas limbata, sp. n. (Pl. XVII., fig. 2).

Fore wing nearest to *H. diffusa* of Butler. The black and white fringe on the hind margin is composed of white spots divided by the black nervules, these spots becoming smaller towards the apex; in the discoidal cell there is one large white spot elongated towards the base of the wing; the whole of the inner is black, and above the first median nervule is a large white spot with a slight streak of white below it. In the centre of the wing from the costa, slanting towards the hind margin, are three oblongate white spots in succession, and there is an additional row of four white spots varying in size near the apex; there are four small white spots near the hind margin, one between each nervule, beginning with the second discoidal or radial nervule, the fourth spot near the submedian nervure being much the largest. Hind wing has nearly the whole of the basal area and centre of the wing white, with a submarginal brown band; on this brown band are four white spots, commencing with the subcostal nervure, these spots decreasing in size towards the third median nervule; the hind margin is white, the nervules being distinctly marked in black; the whole of the hind margin is surrounded by a thin black line, fringed with white between the nervules. Under side is paler in colour than in *H. diffusa*, but all the white markings are quite distinct. The hind wing has only the four white spots marked as on the upper side, instead of a complete row, as in *H. diffusa*. Exp. 2¼ in.

Hab. Madagascar. In coll. Crowley.

Cymothoe marginata, sp. n. (Pl. XVII., fig. 1).

♂. Nearly allied to *C. preusii* of Staudinger. Fore wing. The general colour much brighter, and the black on hind margin much deeper and of greater extent; the hind margin has a broad border of deep brown; at the apex the black extends for a short distance to the subcostal nervure; from the submedian nervure to the costal margin there is a row of hastate markings; at the base there is a patch of yellowish green, with three irregular narrow black lines, in the discoidal cell. Hind wing similar to fore wing, with the same broad border of deep brown and subapical row of black hastate markings. The base of the hind wing has the patch of

yellowish green colour larger, extending to the anal angle, but becoming browner towards the angle; the lines of black in the discoidal cell are present as in the fore wing. Under side of fore wing is much paler in colour, with a narrow transverse line of brown near the middle; the black markings near the base are plainly shown; near the hind margin there are three rows of hastate markings, the colour being greyish green; the first row has a small black spot between each nervure, and the third row is much broader and very distinct, commencing narrowly at the costa and becoming wider at the inner margin. Under side of hind wing is nearly similar to the fore wing, the narrow band of brown continuing to the submedian nervure, but the third row of hastate markings commencing broadly at the costa and terminating just above the second median nervule. Exp. 2¼ in.

Hab. Sierra Leone. In coll. Crowley.

Charaxes Gabonica, sp. n. (Pl. XVII., fig. 3).

♂. This species resembles the Burmese *C. Nicholii* of H. G. Smith, Rhop. Exot., pt. ii., pl. ii., fig. 1 & 2, more nearly than any African species I have hitherto seen. The fore wing is rufous-black, with a very large basal area of chocolate; in the centre of the inner margin is a large patch of yellowish white, quadrate in form and extending to the first median nervule, margined by a line of bluish grey on each side; above this patch are five subovate spots of white, three of medium size, commencing with one at the end of the discoidal cell, succeeded by two larger spots between the second and third median nervules, and two much smaller between the fourth subcostal and the first discoidal or radial nervule; there is also a row of small white spots situated between the discoidal cell and hind margin; close to the hind margin, between the submedian and first median nervules, there is one white spot of moderate size. The hind wing is cream-colour, with the basal area chocolate, shading into grey; the hind margin is scalloped and has a thin line of black, with two small tails, one at the end of the third and the other at the end of the first median nervule; at the end of the costa near the hind margin there is a black spot with a small white centre, and there is also a submarginal border of small spots having cream-coloured centres encircled with a narrow black line, which is more pronounced near the hind margin; from the costa to the anal angle the colouring of the transverse band on the under side showing through forms a grey band. Head and upper part of thorax chocolate, the rest of thorax and base of abdomen black, the end of abdomen grey. Under side: fore wing

pearly white, the nervules brown, having the white spots on the upper side plainly marked; near the hind margin, between the first and submedian nervules, there is a large black spot. Hind wing nearly white, with a broad transverse band of chocolate, somewhat irregular in outline, from the costa to the anal angle bordered on its basal side with a faint bluish line, which is again bordered by a rather stronger black line. The whole of the head, abdomen, and thorax white. Exp. 3½ in.

Hab. Gaboon. In coll. Crowley.

Philognoma violinitens, sp. n. (Pl. XVIII., fig. 1).

♂. Fore wing similar to *P. Decius*, Fabr., but differs in having the transverse band across the wings much broader; this pearly-white band is bordered on either side with a band of pale mauve of varying width, being much broader, with more of a blue tint on the basal side. Hind wing has the white band extended to a little below the first median nervure narrowing to a point; the blue and mauve edgings are much broader than in the fore wing; the orange patch is much less extended than in *P. Decius*. Exp. 3¼ in.

Hab. Accra. In coll. Crowley.

The female (Pl. XVIII., fig. 2) differs still more from *P. Decius*, the general colour being black rather than brown; the band of white which traverses both wings is much broader, with a slight indication of mauve edging near the base below the discoidal cell near the hind margin there is a hastate mark of pearly white, tinged with red between each nervule. The hind wing has the white transverse band narrowing towards the inner margin; there is an outline of mauve on the basal side; near the hind margin there are six ocelli increasing in size from the costa to the anal angle; these ocelli are chestnut-red, with white borders on the upper edge, each spot having a small black centre. Under side is much deeper in colour than in *P. Decius*, the base being deep rufous-brown, with vermiculations; all the markings are very similar to *P. Decius;* the white above the ocellus nearest the anal angle is surmounted by a black band. Exp. 3¾ in.

Hab. Cameroons. In coll. Crowley.

I take this opportunity of illustrating the under-mentioned new species of African *Lycænidæ* in my collection, described by Miss E. M. Sharpe, in the

'Annals and Magazine of Natural History,' Part 6, No. 31, issued July, 1890:—

Pseudaletis trifasciata, sp.n. (Pl. XVIII., fig. 8).
Hab. Sierra Leone.

Zeritis leonina, sp. n. (Pl. XVIII., fig. 5).
Hab. Sierra Leone.

Zeritis fallax, sp. n. (Pl. XVII., fig. 4).
Hab. Sierra Leone.

Zeritis latifimbriata, sp. n. (Pl. XVII., fig. 5).
Hab. Sierra Leone.

Aphnæus chalybeatus, sp. n. (Pl. XVIII., fig. 7).
Hab. Sierra Leone.

Lycænesthes voltæ, sp. n. (Pl. XVIII., fig. 6).
Hab. Volta River.

Epitola Crowleyi, sp. n. (♂, Pl. XVII., fig. 6; ♀, fig. 7).
Hab. Sierra Leone.

Explanation of Plates XVII. & XVIII.

PLATE XVII.

Fig. 1. *Cymothoe marginata.*
2. *Hypolimnas limbata.*
3. *Charaxes gabonica.*
4. *Zeritis fallax.*
5. *Z. latifimbriata.*
6. *Epitola crowleyi*, ♂.
7. *E. crowleyi*, ♀.

PLATE XVIII.

Fig. 1. *Philognoma violinitens*, ♂.
2. *P. violinitens*, ♀.
3. *Mylothris subfusa*, ♂.
4. *M. subfusa*, ♀.
5. *Zeritis leonina*.
6. *Lycænesthes Voltæ*.
7. *Aphnæus chalybeata*.
8. *Pseudaletis trifasciata*.

XVIII. *A catalogue of the* Pyralidina *of Sikkim collected by* Henry J. Elwes *and the late* Otto Möller. By Pieter C. T. Snellen, Hon. F.E.S., with notes by H. J. Elwes, F.L.S.

[Read April 2nd, 1890.]

Plates XIX. & XX.

PYRALIDINA, *Lederer.*
(Wien. Ent. Monatsclir., vii., p. 243, &c.).

D. PYRALIDIDÆ, *Led.*

Genus Paravetta, *Moore*, P. Z. S., 1865, p. 814.

1. *Paravetta discinota.*

Paravetta discinota, Moore, P. Z. S., 1865, p. 814, pl. xliii., f. 3, ♀; S. & C., No. 1158.

In the genus *Paravetta*, which belongs to the *Pyralidina*, vein 8 of hind wings is free, the ocelli are wanting, the maxillary palpi short but distinct, filiform, the tongue spiral, the labial palpi short, porrect, pilose. For other characters see Moore, *l. c.*

Sikkim; Möller.

[Darjeeling; Elwes. Taken at light from June to September. The plate, which represents a female, is not a correct one, the colours being less distinct than they are represented. A nearly allied and perhaps identical species is found on the Naga Hills.—H. J. E.]

2. *Paravetta Sikkima.*

Paravetta Sikkima, Moore, Descr. Indian Lep. Atk., p. 70 ♂; S. & C., No. 1159.

This species does not so much differ from *Discinota* by the smaller size as by the different markings and the much more angular hind margin of the fore wings.

[This latter point is not constant in my specimens, but the much darker colour will easily distinguish it. The female is also in my collection, and is like the male,

but with longer wings, and the antennæ filiform with minute setæ.—H. J. E.]

Sikkim; Möller. October, Mongpo, 4000 ft.; Gammie.

3. *Paravetta flexuosa*, nov. sp.

One female of 36 mm. expanse.

Differs from *discinota* and *Sikkima* by the colour and form of the lines on the fore wings; they are black, not pale; the first is twice bent, in the discoidal cell and from its inner margin to that of the wing, the second nearly straight, flexuous in the middle, running from two-thirds of the costa to three-fourths of the inner margin. Besides, the fore wings are broader. General colour pale pinkish brown, palpi and thorax darker; basal third of fore wings dusted with blackish brown; transverse lines and a slender oblique linear discal mark blackish grey, distinct. Behind the second the ground is darker, first ochreous brown, then along hind margin purplish grey, both colours separated by an ill-defined blackish line, the upper half of which is flexuous and wavy, the inferior straight, running close to the second transverse line. Fringes dark brown. Hind wings paler, somewhat cupreous and shining. Discal line (at two-thirds of the wing as in the other species) dark, but very indistinct. Fringes purplish grey. Under side pale pinkish brown; a common discal line and the hind margins of all wings darker, those of the fore wings before the fringes purplish grey. Legs brown with pale tarsi, the posterior pair with dark brown tufts on the tibiæ and the first article of the tarsi.

Sikkim interior; Möller. Mongpo, 4000 ft.; Gammie.

Mr. Elwes since has received two males, of which he sent me one for examination. I observe a brush of long hairs at the base of the wings below, which is also present in the male of *Xestula miraculosa*, Snellen (see 'Mémoires sur les Lépidoptèra,' ii., p. 195). This character frequently occurs in the *Pyralidæ*.

[Genus Danaka, *Moore*, Descr. Atk., p. 71, t. 3, f. 10, ♂ (1879).

4. *Danaka pyraliformis*, Moore, *l. c.*

Two specimens in bad condition, which agree with the plate of this species. Mr. Snellen refrains from any observations on their generic characters, which do not

seem to differ appreciably from those of *Paravetta*.—H. J. E.]

Genus Sybrida, *Walk.*, Cat., 32, p. 465.

5. *Sybrida inordinata.*

Sybrida inordinata, Walk., Cat., 32, p. 465, ♂; Butl., Ill. Het., vi., p. 28, t. 107, 8, ♂; S. & C., No. 1114.

The genus *Sybrida* is closely allied to *Paravetta*, only the hind margin of fore wings is more regularly rounded, and the antennæ of the male more broadly pectinated.

Sikkim; Möller.

[As the female of this species is undescribed, I may say that it is considerably larger than the male, and much pinker in colour on both wings and both surfaces. The antennæ are very faintly serrate, as in *Paravetta*, but the legs are similar to those of the male, and very peculiar in their structure, as decribed by Walker, who suggests the affinity to the *Pyralidæ*. Butler says the natural position of the genus can only be decided by breeding. He also says that the inner line on the fore wings was overlooked by Walker, but in his figure he makes this look both too distinct and too close to the outer line, as five males in my collection all agree in this point. The shape of the wings, as well as the colour, in his plate is also incorrect.

The species is not uncommon at low elevations in Sikkim, but I have not taken it myself.—H. J. E.]

Genus Toccolosida, *Walk.*, Cat., 27, p. 14.

6. *Toccolosida rubriceps.*

Toccolosida rubriceps, Walker, Cat., 27, p. 14, ♂; S. & C., No. 4730.

Toccolosida is a genus of *Pyralidina* allied to *Paravetta*, not to the *Crambidæ* or *Phycididæ;* the form of the wings and the palpi are nearly the same as in *Paravetta*, but the antennæ are much longer, as long as two-thirds of the costa of fore wings, pubescent in the male. Neuration as in *Paravetta*.

[The hind margin of the fore wings below is not cinereous, as described by Walker, but vitreous greenish

grey. It seems very rare in Sikkim, and occurs also in Silhet and the Naga Hills.—H. J. E.]

Sikkim; Möller.

7. *Toccolosida? pallifrons*, nov. spec.

One female of 31 mm. expanse.

It is only provisionally that this species is described here as a *Toccolosida*, as the male is still unknown to me. I do not perceive maxillary palpi, which are short and filiform, but distinct in *T. rubriceps;* however, as the head of the only female is damaged, these organs may exist in perfect specimens. Head and thorax luteous, mixed with rufous brown. Fore wings dark fuscous at the base and rufous brown between the discoidal cell, vein 5 and the inner margin; the costal half of the wing pale greyish luteous, with a black discal dot. Rufous part of the wing marked with two oblique pale transverse lines, the second somewhat flexuous, whiter and remounting close to hind margin till the apex. Fringes dark grey, variegated with whitish. Form of fore wings nearly as in *T. rubriceps*. Hind wings with a very distinct obtuse angle in cell 3, thus of a different shape as in *rubriceps*. The outer third is rufous brown, the basal part blackish brown, with two flexuous white lines and a vitreous spot between them.

Sikkim, April 20th, 1888; Möller.

Genus Vitessa, *Moore*, Cat. E. I. C. Mus., ii., p. 299; Led., p. 334.

8. *Vitessa Suradeva*.

Vitessa Suradeva, Moore, Cat. Lep. East India Comp., ii., p. 299, pl. 7 *a*, f. 7; Lederer, Wien. Ent. Mon., vii., p. 334, pl. 6, f. 6; S. & C., No. 4516.

In the description of the genus *Suradeva*, Moore, Lederer says:—"Der Hinterleib . . . . beim Manne . . . . gegen hinten zu sehr erweitert, mit klumpenförmiger, am Ende borstig behaarter Afterspitze die eigenthümlich gebildete Afterklappen vermuthen lässt." A male of this species, from the Naga Hills, shows that this club-like end of the abdomen hides a considerable tuft of long hairs; it is exserted in the said specimen, which bears also a MS. note, intimating that in the living insect the anal tuft smells strongly of bitter almonds.

Sikkim; Möller.

Genus Tyspana, *Moore*, Lep. Ceyl., iii., p. 256.

9. *Tyspana vitessoïdes.*

Tyspana vitessoïdes, Moore, Lep. of Ceylon, p. 256, pl. 178, f. 3, 3*a*; S. & C., No. 4517.

Sikkim, one male; Brit. Mus.

Genus Cledeobia, *Steph.*, Cat., 1829; Led., p. 336.

10. *Cledeobia angulifascia.* (Pl. XIX., fig. 4).

Pyralis angulifascia, Moore, Descr. Atk., p. 206 (1887).

A pair of 21—22 mm. expanse.

Belongs to Lederer's Section B of the genus, and comes next to *brunnealis*, Treits., but is distinct by the long tegulæ of the male, reaching almost to the half of the abdomen, the somewhat larger size, the much more flexuous second line of the fore wings, and the darker colour of their basal and marginal thirds. Head with palpi and thorax pale greyish luteous. Basal and marginal third of fore wings dull black, central area pale cold greyish luteous, a little dusted with black, and with a round black discal dot, the costal margin narrowly black, with distinct minute pale dots. The width of the central area is at the costa the double of that on the inner margin, being limited by the strongly flexuous paler second line. The first line, which limits the basal area, is nearly perpendicular, a little flexuous in the middle. Marginal line pale, with indistinct black dots. Fringes dark grey. Hind wings grey, the fringes with a dark basal line. Abdomen grey; anal tuft of male ochreous.

Sikkim, Elwes; Sikkim interior; Möller.

Genus Propachys, *Walk.*, Cat., 27, p. 5.

11. *Propachys nigrivena.*

Propachys nigrivena. Walker, Cat. 27, p. 6; S. & C., No. 4728.

Vein 8 of hind wings is free, the ocelli are present, and the remarkable labial palpi almost formed as in the genus *Nosophora* (see Lederer, Wien. Ent. Mon., vii., pl. 4, f. 26).

Sikkim; H. J. Elwes.

[Seems common at low elevations, but I have not taken it myself. Occurs also in the Khasia Hills and China.—H. J. E.]

12. *Propachys linealis.*

Propachys linealis, Moore, P. Z. S., 1867, p. 665, pl. 33, f. 17; S. & C., No. 4727.

Darjeeling, Dharmsala; Brit. Mus.

[Seems rare in Sikkim.—H. J. E.]

Genus Oryba, *Walk.*, Cat., 27, p. 10.

13. *Oryba conspicualis*, nov. spec. (Pl. XX., fig. 3).

A pair of 28—29 mm. expanse.

Palpi fully twice as long as the head, porrected, their base narrowly white, the remainder deep rosy. Head and thorax reddish grey, also the basal article of the setaceous rufous brown antennæ, which in the male sex is larger and curved. Fore wings partly pale vermilion-red and clear purplish grey, marked with two distinct simple, nearly black, transverse lines; a somewhat reniform pale yellow-red bordered spot below the middle of the costa, and another vitreous white, which occupies the base of the cells 3 and 4, interrupting the second line. Hind wings whitish, tinged with red at the base, on the inner third, and along the anterior margin above vein 6, grey at the apex. The central area, from the discoidal cell till hind margin, is pale vermilion-red, divided by a recurved distinct black discal line. Fringes dark grey from the apex of fore wings till vein 3 of hind wings, from thence to the anal angle whitish. Under side of fore wings mostly dark grey, that of hind wings white, red tinged with dark grey, apex and discal line as above. Abdomen with a red spot at the base and paler apex. Breast white, also the inner side of the anterior femora; the remainder of legs deep rosy, with whitish tarsi.

In this species vein 8 of hind wings is free, the ocelli and maxillary palpi are wanting, veins 4 and 5 everywhere unstalked, from a point.

Sikkim; Möller. Darjeeling, July; H. J. Elwes.

[This species is found at about 7—8000 ft. elevation, but seems rare. This is allied to and may possibly be the same as *Oryba plangonalis*, Walk., of which a specimen from Sikkim is in the British Museum.—H. J. E.]

[14. *Euclita sericea*, Warren MSS.

In British Museum from Darjeeling, ex coll. Lidderdale. —H. J. E.]

Genus Stericta, *Led.*, p. 340.

15. *Stericta basalis.*

Pannucha basalis, Moore, Desc. Indian Lep., p. 200, pl. vii., f. 2, ♂; S. & C., No. 4479.

Vein 8 of hind wings is free. I thus should rather place this species in *Stericta* than in *Pannucha*.

Darjeeling, July; H. J. Elwes.

16. *Stericta lativitta.*

Locastra lativitta, Moore, Desc. Indian Lep., p. 199, pl. vii., f. 1; S. & C., No. 4476.

A female. Sikkim; Möller.

17. *Stericta crassipennis.*

Locastra crassipennis, Walker.

A pair.

Sikkim; Möller (♀). Naga Hills, 5000—8000 ft., July, W. Doherty (♂).

18. *Stericta cuproviridalis.*

Locastra cuproviridalis, Moore, P. Z. S., 1867, p. 87; S. & C., 4475.

This species must be placed here, being a true Pyralid, and agreeing with *Stericta* in generic characters; the only difference is that the veins 4 and 5 in both wings are not separate but stalked. Palpi as in *divitalis* and *monesusalis*.

Darjeeling, July 20th and August 4th, 1886; H. J. Elwes.

[Common at Darjeeling at light, and found down to 3 or 4000 ft.—H. J. E.]

19. *Stericta sikkima.*

Taurica sikkima, Moore, Descr. Atk., p. 202 (1887).

A male of 38 mm. expanse.

Third article of palpi shorter and more obtuse than in the foregoing species. Apex of fore wings more distinct than in all the other species of the genus, the anal tuft of the abdomen very obtuse. Veins 4 and 5 unstalked. Head and collar bright cinnamon, third article of

palpi dark brown, the remainder, the antennæ, and thorax, pale brown. Basal fourth of fore wings blackish brown, followed by a pale olive-green posteriorly ill-defined fascia, which is widening towards the costa, and traversed near to and parallel with the dark base by a distinct undulated black line. Of the second half of the wing, the basal two-thirds are deep brown, mixed with ferruginous and olive-green, marked by an indistinct denticulated blackish second line; the marginal third and the fringes being olive-green, with an interrupted distinct black marginal line; fringes spotted with grey. Hind wings dark grey, with a trace of a greenish discal line on the outer third between veins 2 and 5. Marginal line blackish grey, not quite continuous. Fringes as in fore wings. Under side pale olive-green, the basal two-thirds of fore wings and a common discal line dark grey. Abdomen dark grey, with a reddish tuft at the dorsal base. Anal tuft blackish brown. Legs pale olive-green, spotted with grey, the anterior coxæ and the pecten rufous.

Darjeeling, July; H. J. Elwes. Naga Hills; Doherty.

Genus Scopocera, *Moore*, Desc. Ind. Lep., p. 202.

20. *Scopocera Pyraliata.*

Scopocera Pyraliata, Moore, Descr. Ind. Lep., p. 202; S. & C., No. 4484.

A female. Vein 8 of hind wings is free, the labial palpi are very long, recurved, and pointed.

Sikkim; Möller.

21. *Scopocera minor.*

Scopocera minor, Moore, Descr. Indian Lep., Atk., p. 203.

A male.

Sikkim, 7000 ft.; Möller.

Genus Orthaga, *Walk.*, Cat., 16, p. 191.

22. *Orthaga euadrusalis.*

Orthaga euadrusalis, Walk., Cat., 16, pp. 191, 248; Moore, Lep. of Ceylon, p. 259, pl. 178, f. 2, 2*a*, 2*b*; S. & C., No. 4488.

Sikkim; Möller.

[The types were from Borneo and Ceylon.—H. J. E.]

[*Orthaga obscura*, Moore, Descr. Atk., p. 204.

Darjeeling; Atkinson.

Mr. Moore has lent me a specimen of this, which seems very near to the last; but it is not in good enough condition to justify an opinion.—H. J. E.]

Genus Asopia, *Treitschke*, vii., p. 146; Led., p. 342.

23. *Asopia platymitris.*

Pyralis platymitris, Butler, P. Z. S., 1883, p. 166; S. & C., No. 4459.

Darjeeling (Brit. Mus.).

24. *Asopia subresectalis*, nov. spec.

One male of 17 mm. expanse.

This species has, judging from the figure and description, much conformity with *Asopia resectalis*, Lederer, Wien. Ent. Mon., vii., pp. 343, 458, pl. 7, f. 6, but as the author says that the third article of the palpi is porrect ("vorgeneigt"), whereas it is erect in *subresectalis*, and that *resectalis* is from Venezuela, and has the size of *glaucinalis* (24—26 mm.), I conclude that the Sikkim species is distinct. Labial palpi as long as the head, recurved, narrow, gradually attenuating, their second article not thickened towards the summit. They are pale brown, like the head and antennæ. The thorax and the fore wings, which very much resemble those of *resectalis*, are pale glossy luteous. Traces of a paler, almost straight, first line are perceptible near the base; the discal dot minute, dark, distinct. Edge of costa narrowly dark brown, but without pale streaks. Second line a little paler than the ground colour, almost regularly concave, without undulations. Outer third of wing deep chestnut-brown, paler from the middle till hind margin. Fringes, judging from the remainder at the anal angle, rufous. Hind wings purplish, with a faint pale discal line and yellowish fringes. Under side nearly as above, but paler, more uniform and duller, the lines rather more distinct. Abdomen luteous.

Sikkim; Möller.

25. *Asopia gerontesalis.*

Pyralis gerontesalis, Walker, Cat., 19, p. 896; Moore, Lep. of Ceylon, p. 263, pl. 178, f. 6; S. & C., No. 4447.

Manihotalis, Guen., Spec. 8, p. 121, is from Cayenne, and the first line of f. w is not "tremblé"; but *manihotalis*, Gn., Réun., p. 61, may be *gerontesalis*, after Guenée's expression concerning the "extrabasilaire."

[A single worn specimen only.—H. J. E.]

Sikkim; Möller.

Genus Banepa, *Moore*, Descr. Ind. Lep., p. 204.

26. *Banepa Atkinsonii.*

Banepa Atkinsonii, Moore, Descr. Ind. Lep., p. 204, ♂ ♀; S. & C., No. 4491.

Vein 8 of hind wings is stalked with 7 in this species.

[Darjeeling, July, 1886; H. J. Elwes. Seems uncommon; taken once at light by me.—H. J. E.]

Genus Rhodaba, *Moore*, Desc. Ind. Lep., p. 205.

27. *Rhodaba angulipennis.*

Rhodaba angulipennis, Moore, Desc. Ind. Lep., p. 205; S. & C., No. 4492.

In this genus vein 8 of hind wings is also stalked with 7.

Sikkim, Tonglo, 10,000 ft., July; H. J. Elwes. Tendong, 8000 ft.; Elwes, August.

Genus Pseudolocastra, *Warren MS.*

28. *Pseudolocastra inimica.*

Locastra inimica, Butler, Ann. & Mag. Nat. Hist., 5th ser., vol. v., p. 448.

The species of *Pseudolocastra*, a MS. genus of *Pyralidina*, created by Mr. Warren, very much resemble those of *Stericta*, but vein 8 of hind wings is stalked with 7, and so the position of the genus is very different, rather more near *hemimatia*, Lederer. I must, however, point here to Mr. Meyrick's note on this subject (Trans. Ent. Soc. of London, 1887, p. 187).

Darjeeling, 20th July and 20th August, 1886; H. J. Elwes. Sikkim; Möller.

29. *Pseudolocastra syrichthusalis.*

Bertula syrichthusalis, Walker, Cat., 16, p. 165.

Sikkim, 30th May, 1888; Möller.

[The type was from Borneo.—H. J. E.]

Genus Pannucha, *Moore*, Desc. Ind. Lep., p. 199.

30. *Pannucha œnescens.*

Pannucha œnescens, Moore, Desc. Ind. Lep., p. 200; S. & C., No. 4478.

The genus *Pannucha* is allied to *Pseudolocastra*, but the insects are more slender, their labial palpi shorter, narrower, with a short pointed third article.

Darjeeling, 20th July, 1886; Sikkim, 7000 ft.; H. J. Elwes.

31. *Pannucha vicinalis*, nov. spec. (Pl. XX., figs. 2, 2*a*).

A pair of 22 mm. (♂) and 31 mm. (♀) expanse.

This species is closely allied to *œnescens*, but the terminal joint of the palpi is black, with a pale apex, instead of pale brown with a black circle, as in *œnescens*, the central area of fore wings not dusted with black, the second line very strongly indented and projecting between the veins 3 and 5, and conspicuously shaded with black on the outside not only at the anterior margin, but also at the inner. Triangular black patch at the costa near the base shaped as in *œnescens*. Palpi recurved, much narrower than the eyes, a little longer than the head, especially in the female, first and second article pale olive-green. Antennæ of the male with short even ciliations. Head and thorax light olive-green. This is also the ground colour of the fore wings. They are marked, besides the above-mentioned conspicuous three black patches, with a small discal spot, two or three spots on the costa of the central area, and distinct spots on the hind margin, all black. First line indistinct, straight, undulated, hardly paler than the ground, as in *œnescens*. Central area with traces of a central shade. Costal and inferior third of second line straight, moderately indented, its central part abruptly advancing, ejecting long teeth. In *œnescens* the corresponding part is rounded, evenly indented throughout. No submarginal line. Hind wings grey, unmarked. Fringes pale brown with black dots. Under side grey, costa of fore wings

marked with two black spots and pale brownish yellow; hind wings with a pale discal line.

Darjeeling, 4th August, 1886; H. J. Elwes. Sikkim; Möller.

32. *Pannucha asopialis*, nov. spec.

A male of 20 and a female of 22 mm. expanse.

Palpi in both sexes narrower and longer than in *ænescens* and *vicinalis*, the backward recurved tuft at the base of the male antennæ longer, attaining the scutellum, and the general appearance of the insect more slender than in those species. Head with palpi, antennæ, tuft, and thorax deep fuscous; basal fifth, a wedge-shaped discal mark, and the costa of fore wings also. Central part, occupying a little more than the half of the wing, pale olivaceous green, somewhat ænescent. Second line distinct, fuscous, outwardly bent below the middle, and basally with a gradually widening brown shade from vein 5 till the inner margin. Hindward this line is margined with pale olivaceous green. Remainder of wing deep cupreous brown; marginal line fuscous, with indistinct black spots. Fringes fuscous. Hind wings grey, with a fuscous spot near hind margin, and in the female with pale marginal dots. Fringes dark grey. Under side of fore wings fuscous grey; hind wings dirty white, their apical third and a discal line fuscous. Abdomen and legs of female fuscous grey, much paler in the male.

Darjeeling, 21st June, 1886 (♂); Sikkim, 7000 ft., August, 1886 (♀); H. J. Elwes.

33. *Pannucha dimidialis*, nov. spec.

A female of 21 mm. expanse.

Although I have but one female specimen of *dimidialis*, I do not hesitate to describe it, because the structure of the palpi is the same as in *asopialis*, and the neuration also, so that it evidently belongs to the same genus. Antennæ, palpi and face fuscous. Vertex and thorax pale whitish green. Basal half of fore wings also pale whitish green, with fuscous spots on the costa and faint traces of an undulated dark first line. Second half of the wing fuscous, with a denticulated whitish green second line, which is widening at the margins. Marginal line ochreous yellow with black dots. Ciliæ brownish yellow with blackish spots. Hind wings, abdomen, and legs pale grey, also the under side of the wings; a discal line darker, indistinct.

Darjeeling, 20th June, 1886; H. J. Elwes.

34. *Cerasphora variegata.*

Scopocera variegata, Moore, Descr. Indian Lep., Atk., p. 203, pl. 7, f. 4.

A female.

This species belongs to the same genus as *Cerasphora* (*Craneophora*, olim.) *Ficki*, Christ., Bull. de Moscou, 1881, p. 1. It is larger, and the second fascia of fore wings more flexuous. Mr. Christoph altered the name because he found the similitude with *Craniophora*, Snellen, Vlind. van Nederland. Macrol., p. 262, a genus of *Noctuina*, too great.

[Genus Sarama, *Moore*, Desc. Atk., p. 203.

35. *Sarama Atkinsoni*, Moore, *l. c.*, p. 204.

From Darjeeling, in the collections of Mr. Moore and Dr. Staudinger.—H. J. E.]

Genus Endotricha, *Zell.*, Isis. 1847, p. 592; Led., p. 344.

36. *Endotricha flammealis.**

Pyralis flammealis, Wien. Verz., p. 123; Hübn., Pyr., f. 99; Wood, f. 782.

The specimens are darker coloured than the bulk of the European, but I do not perceive any other difference. Time of appearance the same as in North-west Europe.

Darjeeling, July, August; H. J. Elwes; Sikkim, 18th July; Möller.

[Common at light at Darjeeling in May and August. —H. J. E.]

37. *Endotricha costæmaculalis.*

Endotricha costæmaculalis, Christoph, Bull. de Moscow, 1881, i., p. 4; Neue Lep. Amur., p. 92.

Darjeeling, July; H. J. Elwes.

[Described from Vladivostock and the Island of Askold. Seems rare in Sikkim.—H. J. E.]

[* *Doththa similata*, Moore, Descr. Atk., p. 206, of which I have compared the type, is identical with this form. Specimens from Japan and Dharmsala in the British Museum also agree.— H. J. E.]

38. *Endotricha serratalis*, nov. spec.

Two females of 22 mm. expanse.

Serratalis has quite the neuration of *flammealis*, the palpi are also as in that species, and thus, though I do not know the male, I do not doubt that its right place is in *Endotricha*. Palpi, head, thorax, and basal area of fore wings chestnut-brown, the central area somewhat paler, the third or marginal greyish, except at the apex, where it is brown. Lines pure white; the first at one-third, almost perpendicular, with three faint undulations; the second, as usual in *Endotricha*, near to the hind margin, and so the central area very broad: this second line begins at seven-eighths of the costa; its first part is very slender, waved, parallel to hind margin, then, from vein 4 to the inner margin, it is turned inward, thicker and strongly indented. Costa of central area with minute white dots. Fringes fuscous with pale base. Hind wings pale grey. Under side variegated with brown and dark grey, and an indented discal line.

Sikkim; Möller.

[A rare species, which I have never taken myself.—H. J. E.]

Genus Scoparia, *Haw.*, Lep. Brit., p. 498; Led., p. 347.

39. *Scoparia pulveralis*, nov. sp.

Six specimens of both sexes of 18—21 mm. expanse.

The shape of wings in this species is about the same as in *centuriella*, Wien. Verz., *sibirica*, Led., and *dubitalis*, Hübn., but it is distinguished by the very coarse and abundant black suffusion of the fore wings, which renders the markings of some specimens very indistinct. Palpi black with whitish base. Head blackish grey. Thorax bluish grey, much suffused with black scales. Fore wings broad, the hind margins straight, apex rather obtuse. Ground colour clear bluish grey, as in *Scoparia frequentella*, Staint., but in some specimens (from Sikkim interior) so much suffused with black that the ground seems black, sparingly suffused with bluish grey. First line indistinct, straight, slightly undulated, the ordinary adjoining black markings horizontal, elongate, large but indistinct, in one specimen filled up with ochreous brown, in the others black. The 8-shaped mark very broad, indistinct, black, or, in one specimen, filled up with ochreous brown. Direction of second line as in *centuriella* and *dubitalis*, hardly oblique, with a short but distinct curve, the costal part straight. Subterminal band black, the subterminal line as in *dubitalis*, close to hind

margin, broad, not touching the subterminal line, indistinctly interrupted in cell 4. Fringes grey, variegated with white and with black basal dots. Hind wings whitish, shining, thinly scaled. Abdomen pale grey. Under side of fore wings dark grey, of hind wings pale, with a faint darker discal mark and line.

Sikkim, Tonglo, 10,000 ft.; Darjeeling, July; H. J. Elwes; Sikkim interior; Möller.

40. *Scoparia medinella*, nov. spec.

Three specimens of 15½—16½ mm.

Distinguished by the well-visible, rather oblique, white first transverse line, the pale fascia behind the 8 mark, which, as in *lætella*, is connected with a black suffusion on the costa, and the broad black shade along the outside of the first line. Shape of wings as in *dubitalis*, the fore wings narrower. Palpi black with white base; head black. Thorax grey, mixed with black. Basal fourth of fore wings black, with bluish grey scales. First line very distinct, bluish white, hardly undulated, rather oblique, its direction as in *ambigualis*. Markings at first line very indistinct, merged in the above-mentioned broad black suffusion. Discal mark 8-shaped, oblique, filled with bluish grey, connected with costa by a black suffusion; behind it the bluish white ground colour of the wing forms a curved fascia, which, however, does not reach the inner margin. Second line very slender, its central curve short, flat, its inferior part parallel with hind margin; towards the base this line is narrowly edged with black. Subterminal band black, with a strongly interrupted whitish subterminal line. Fringes bluish white, with black basal dots. Hind wings shining, pale grey with whitish fringes. Under side of fore wings dark grey, the hind wings whitish with a grey apex, and an indistinct grey discal line.

Sikkim; H. J. Elwes. Sikkim interior; Möller.

Genus Eclipsiodes, *Meyrick*, Trans. Ent. Soc. Lond., 1884, p. 343.

41. *Eclipsiodes pangialis.*

Botys pangialis, Feld. & Rogenh., Novara, ii., 2, pl. 134, f. 25 (1874).

Pyralis cuprealis, Moore. Ann. & Mag. of N. H., ser. v., i, p. 235; 2nd Yarkand Mission, Lepid., p. 13, pl. 1, f. 26.

A female.

The front is protuberant, rounded; but the palpi are destroyed, so I cannot say whether they are of the same form as in *Crypsixantha*, Meyrick.

Sikkim; Atkinson.

Genus Botys,* *Treitschke*, vii., p. 78; v. Hein., Schmett. Deutschl. 2, Band i., 2, p. 58. (*Botys*, Led., p. 364, pars.)

42. *Botys Silhetalis.*

Pyrausta Silhetalis, Guenée, Delt. et Pyr., p. 166, No. 78.

Porphyritis Sikkima, Moore, Desc. Indian Lep., p. 207; S. & C., No. 4337.

A variety with deep orange markings on the fore wings, consisting in an oblique fascia near the base, not reaching the costa, and a second at two-thirds, which is perfect, much dilatated in its upper half, sinuated near the inner margin. In other respects it well agrees with Guenée's description of the type, which has unmarked fore wings. In the British Museum this variety is labelled *maculata*, Butler, and identified with *Porphyritis Sikkima*.

Sikkim; Möller.

43. *Botys ? quadralis.*

Scopula quadralis, Walker ? ?.

Two worn males.

The arrangement under *Botys* is only provisional; I think the species must form a new genus, for the costa of hind wings is sinuate, and the palpi are unusually long.

Sikkim; H. J. Elwes.

[The specimens agree with one in Atkinson's collection named *Scopula quadralis*, Walk., by Moore, but I can find no description of the species, which is not *Dichromia quadralis*, Walk.—H. J. E.]

* Prof. Zeller, Verh. Zool. Bot. Ges., 1872, p. 503, corrected the name of the genus to *Botis*, because this word signifies a "hirtin" (shepherdess), but Lederer called the genus *Botys*, and I believe the reason alleged by Zeller is not sufficient for an alteration of the name.

44. *Botys patulalis.*

Botys patulalis, Walker, Cat., 34, p. 1405; S. & C., No. 4070.

Sikkim; Möller.

[Occurs at low elevations; not uncommon.—H. J. E.]

45. *Botys curyclealis.*

Botys curyclealis Walker, Cat., 18, p. 651.

A female.

The markings are nearly the same as in *Botys cambogialis*, Guenée, but the insect is larger, and has shorter labial palpi. I do not know the male.

Sikkim; Möller.

46. *Botys coclesalis.*

Botys coclesalis, Walk., Cat., 18, p. 701.

Sikkim; Möller.

[The type was from Borneo.—H. J. E.]

47. *Botys ochrealis.*

Botys ochrealis, Moore, P. Z. S., 1877, p. 614; S. & C., No. 4069.

Sikkim; Möller.

[Seems not uncommon at low elevations.—H. J. E.]

48. *Botys præpandalis*, nov. spec.

A dozen specimens of 22—29 mm. expanse.

The proper place of this *Botys* is evidently between the European *hyalinalis* and *pandalis;* it is, however, in the male sex devoid of the peculiar character displayed by the last-named species (upper side of fore wings* in the male with a groove at the base of the upper median vein, covered by a flat crest of scales). Besides, the ochreous yellow colour of wings and body, though, generally speaking, the same, is, in fresh specimens, more vivid;

* Not *hind* wings, as Lederer erroneously states (Wien. Ent. Mon., vii. (1863), p. 365).

the lines, especially the discal line of hind wings, are strongly serrated and interrupted, while in the above-named species this line is more sinuated and almost entire; finally, the abdomen of the male is but a little longer than the inner margin of hind wings, and the hind margin of fore wings much less oblique. Antennæ ochreous yellow, setaceous, distinctly ciliated in the male (in *hyalinalis* and *pandalis* they are nearly bare). Labial palpi bicolorous, the first article and the adjoining parts of the throat and head pure white, the second and third ochreous brown. In *pandalis* the second article of the palpi is also partly white. Front, vertex, and thorax ochreous yellow. Upper side of wings deep ochreous yellow, without any lustre, except on hind wings towards the anterior margin, where the colour is whitish, transparent, and a little glossy. The neuration is somewhat darker scaled than the cells, also the costa of the fore wings, which in some specimens even darkens to ochreous brown approaching the base. The markings are deep ochreous yellow, and consist on the fore wing in an arched first transverse line with nearly perpendicular under half in a point, and a lunule in the discoidal cell, in a distinctly serrated second line, interrupted along vein 3, and quite as in the two above-mentioned European species, in an antemarginal (waved) line. The upper part of the latter, however, is more distinctly and more regularly bent on the fore wings and behind it; in none of the specimens is the hind margin obscurated, as frequently occurs in the allied species. Hind wings with a distinctly serrated, interrupted, discal line, and a waved line nearly parallel to the hind margin. Ciliæ deep ochreous yellow; marginal line and another on the base of the ciliæ darker. Abdomen deep ochreous yellow, with paler annulations and under side. Anal brush very short. Under side of wings ochreous yellow, slightly paler but not so pure as above. The waved (antemarginal line) fuscous and more diffused, the other markings only indicated. Discoidal cell of fore wings wholly fuscous, as is also the case, but not so thoroughly, in *pandalis*. Legs ochreous brown; a spot on the fore tibiæ, the anterior tarsi, and the outside of the somewhat thickened middle tibiæ, pure white.

Darjeeling, July, August; H. J. Elwes. Sikkim; Möller.

[A common species, which varies in the shade of yellow. I think it must have been hitherto confused with some other species.—H. J. E.]

49. *Botys damastesalis.*

Scopula damastesalis, Walker, Cat., 19, p. 1013.
Paliga damastesalis, Moore, Lep. of Ceylon, p. 350; S. & C., No. 4147.

A very brightly marked specimen.

Sikkim; Möller.

[Evidently a rare species in Sikkim.—H. J. E.]

50. *Botys tranquillalis.*

Botys tranquillalis, Lederer, Wien. Ent. Mon., vii., pp. 371 and 466, taf. 9, f. 16.

Sikkim; Möller.

[Seems abundant, probably at low elevations. The type from Ternate.—H. J. E.]

51. *Botys nobilis.*

Pionea nobilis, Moore, Descr. Indian Lep., Atk., p. 224, pl. 7, f. 29.

A male.

Nobilis is no *Pionea*, Lederer; the maxillary palpi are not brush-like (buschig) and hairy, but smooth. The pattern of the design is also not that of *Pionea*.

Sikkim; Möller.

52. *Botys flavofasciata.*

Hapalia flavofasciata, Moore, Desc. Ind. Lep., p. 223, pl. vii., f. 19; S. & C., No. 4092.

Sikkim; Möller. Darjeeling; Brit. Mus.

The male is paler than the female, with more distinct markings, and has, at the under side of the fore wings, near the costa, between vein 7 and the stalk of 9 and 10, a small flat crest of lustrous scales.

53. *Botys nubilalis.*

Pyralis nubilalis, Hübn., Samml. Eur. Schmett., Pyral., f. 94 (♂).

P. silacealis, ibid., f. 116 (♀).

Botys silacealis, Treits., Schmett. von Europa, vii., p. 81; x., 3, p. 17.

A male, Sikkim; Möller. Another, from the Naga Hills, 5500—7000 ft., has the ochreous fascia behind the second line of fore wings much narrowed.

54. *Botys plumbocilialis*, nov. spec.

A female of 19 mm. expanse.

This species is a distant relative of *paupellalis*, Led., with which it agrees in some respects, as in the ochreous colour, the slender dark grey markings, and in the general appearance of the fringes; but it is much larger, paler, not reddish: of the fringes of hind wings the exterior half is white, and the costal part of the second line of fore wings is more rounded. Palpi porrected, rostriform, pointed, the basal half white, the upper pure ochreous yellow as the body and upper side of wings. Lines slender, distinct, the first obtusely broken below the middle, hardly undulated; the second with a distinct sinus in the middle, evanescent along vein 3. Discal markings very distinct, consisting in a dot, and in a nearly straight lunule on the disco-cellular. Hind wings with a similar discal line as the second of fore wings; submarginal line shady dark grey; marginal line also dark grey, as the fringes; these are glossy and have a still darker basal line; those of hind wings are white, with a thick, undulated, nearly black basal line. In *paupellalis* the fringes are white, with a black basal line, which is also undulated on hind wings. Under side paler, suffused with grey.

Darjeeling; 4th August, 1886; H. J. Elwes.

55. *Botys octoguttalis.*

Botys octoguttalis, Felder & Rogenh., Novara, ii., 2, pl. 135, f. 38.

Circobotys octoguttalis, Moore, Lep. of Ceyl., p. 343, pl. 182, f. 11; S. & C., 4122.

Sikkim; Möller.

[Seems rare in Sikkim. The type from Natal and Australia.—H. J. E.]

56. *Botys effusalis.*

Botys effusalis, Walker, Cat., 34, p. 1445.

Sikkim; Möller.

[The type from Java.—H. J. E.]

57. *Botys rubellalis*, nov. spec.

A pair of 21 and 25 mm.

This species is allied to *diffusalis*, Guen., *affusalis*, Guen., and *testacealis*, Zell.; it has the same reddish colour, and, in fact, comes very near to *affusalis*, which is also an Indian species, and, after Guenée, of the same size. The fore wings are, however, not still more iridescent and transparent than in *diffusalis*, but, on the contrary, very dull and opaque, nor are the two first abdominal segments white; they are concolorous with the other. Labial palpi porrect, rostriform, twice as long as the head, bicolorous, ochreous brown, and white. Head, thorax, and abdomen sordid reddish ochreous. Upper side of wings sordid ochreous yellow, but evenly powdered with dark red scales on the costa, but not completely till the apex these scales are more abundant; markings also dark dull red, the first line almost as in *croccalis*, broken in cell 1 *b*, the second line more sinuous, with a tooth in cell 1 *c*, and not distinctly reaching the costa. Disco-cellular with a short streak, as in *crocealis;* marginal line and fringes a little brighter than the markings. Anterior third and inner margin of hind wings without red scales, a little glossy. Discal line sinuous, dark red, beginning at the limit of the paler costal part; discal spot macular, indistinct; hind margin with a dark red shade from veins 3—6. Marginal line as in fore wings; the fringes also, but their extremity more distinctly ochreous. Under side paler, with greyish hind margins. Body and legs almost white. In the male, which, indeed, is not so well-preserved as the female, and also darker, the markings are more indistinct. The abdomen is long and slender, as in *crocealis*, with a grey anal tuft.

Sikkim interior; Möller.

58. *Botys coactalis*, nov. spec.

A female of 25 mm. expanse.

I do not know any *Botys*, closely allied to this species, which is very distinct by its greyish ochreous brown fore wings, fuscous hind wings, and bright yellow fringes. Palpi porrect, rostriform,

twice as long as the head, bicolorous, white and brown. Face ochreous. Vertex and thorax greyish ochreous brown, as the fore wings, the edge of costa towards the apex narrowly yellow. Markings fuscous; the first line very faint, the discal mark lunular; the second line not undulated, twice obtusely broken. Fringes pale golden yellow, also on hind wings, which are not darker, but more greyish, and have a faint, angular, darker discal line, more distinct on the dark grey under side. Abdomen dark grey, paler beneath.

Darjeeling, 4th August, 1886; H. J. Elwes.
[Seems a common species.—H. J. E.]

59. *Botys Ausonialis*, nov. spec.

Three specimens of 34 mm. expanse.

This species is slender, and has ample wings; the setaceous antennæ are fully as long as two-thirds of the costa of fore wings. Palpi porrect, twice as long as the head, but not very acute, bicolorous, greyish brown and white. Upper side of wings pure grey, nearly as in *Heterodes Ausonia* Cram., and *Botys laticalis*, Lederer, but unicolorous, dull, the costa of fore wings slightly paler, a common indistinct discal line darker, hardly sinuous, not dentated. Discal mark of fore wings also darker, small, indistinct. Fringes grey, as the wings, more glossy. Under side of wings with legs and body pure greyish white, the markings as on upper side, but the discal line very faint on hind wings. Fringes dark grey.

Sikkim; Möller.

60. *Botys ablactalis*.

Botys ablactalis, Walker, Cat., 18, p. 660 (var. α).
B. murinalis, Pagenstecher, Verhandl. d. Nassauisch. Vereins für Naturkunde, 38 (1885), p. 54.

Walker's variety β of *ablactalis* seems to be specifically distinct.

Sikkim; Möller.

61. *Botys tropicalis*.

Botys tropicalis, Walker, Cat., 18, p. 670, 1.
Protonocera tropicalis, Warren MSS.
Coptobasis tropicalis, Moore, Lep. Ceyl., iii., p. 293, t. 181, fig. 9; S. & C., No. 4276.

Sikkim; Möller.

[Described from Ceylon and figured by Moore, but the figure does not represent the species as identified by Messrs. Snellen and Warren.—H. J. E.]

62. *Botys detritalis.*

Botys detritalis, Guenée, Delt. et Pyr., p. 347, pl. 4, f. 10.

Darjeeling, July, 1886; H. J. Elwes.

[Described by Guenée from Brazil, Columbia, Guyana. —H. J. E.]

63. *Botys stultalis.*

Botys stultalis, Walker, Cat., 18, p. 669.

A male.

Not different from my Javan specimens.

Sikkim; Möller.

64. *Botys subargentalis*, nov. spec.

Acharana subargentalis, Swinhoe MS.

Two pairs of 28—31 mm. expanse.

A somewhat inconspicuous species; the upper side dark grey, a little lustrous, only with traces of the ordinary markings, but distinguished by the white under side of the hind wings and the body. Antennæ setaceous, in the ♂ with very short (one-third) and even ciliation. Labial palpi only the half longer than the head, rostriform, obtuse, bicolorous, white and dark grey. Head, thorax, upper side of body and wings, dark grey, somewhat lustrous. Only traces of discal spots and the ordinary lines are seen. Fringes of fore wings concolorous, of hind wings whitish. Under side of fore wings dark grey, the base with a few white scales. Under side of hind wings white; a discal spot, the upper part of an imperfect discal line and sufiusion along the upper part of hind margin (especially towards the apex) dark grey. Fringes whitish. Under side of body and legs white, suffused with dark grey. Anal tuft of male blackish.

Near *B. Korndörferi*, Snell., Midd. Sumatra, Lepid., p. 62, but larger, more lustrous, with less distinct markings, more obtuse palpi, and nearly pure white under side of hind wings.

Sikkim; Möller, 7000 ft. Darjeeling; H. J. Elwes.

65. *Botys caletoralis.*

Botys caletoralis, Walker, Cat., 18, p. 651.
Charema caletoralis, S. & C., No. 4233.

Sikkim; Möller.

[Seems a rare species, as only a single broken specimen was in Möller's collection. The type from Sylhet. —H. J. E.]

66. *Botys caldusalis.*

Botys caldusalis, Walker, Cat., 18, p. 650; S. & C., No. 4049.

Sikkim; Möller.

[Seems not uncommon at an elevation of about 3—4000 ft.—H. J. E.]

67. *Botys tardalis.*

Botys tardalis, Snellen, Tijdr. v. Ent., 23, p. 210; id., 26, p. 130, pl. 7, f. 6, 6*a*.

Sikkim, 7000 ft., August, 1886; H. J. Elwes. Khasia Hills, 4000 ft., September, 1886; id.

[The type from Celebes.—H. J. E.]

68. *Botys robusta.*

Hapalia robusta, Moore, Desc. Indian Lep., p. 222, pl. 7, f. 27; S. & C., No. 4102.

Sikkim, 7000 ft.; H. J. Elwes.

[Not very rare at 7—8000 ft.—H. J. E.]

69. *Botys indistans.*

Hapalia indistans, Moore, Desc. Indian Lep., p. 223; S. & C., No. 4094.

Darjeeling, 20th July and 4th August; H. J. Elwes. Sikkim; Möller. Dharmsala; Brit. Mus.

70. *Botys oblita.*

Hapalia oblita, Moore, Desc. Indian Lep., p. 222; S. & C., No. 4100.

Darjeeling, July, 1886; H. J. Elwes.

71. *Botys Hypatialis.*

Scopula Hypatialis, Walker, Cat., 19, p. 1014; *Udea Hypatialis*, Moore, Lep. of Ceylon, p. 349; S. & C., No. 4151.

Udea renalis, Moore, Descr. New. Lep., Atk., p. 224.

This species has, on the under side of the fore wings, the dark costal streaks towards the apex, which are also found in *B. prunalis*, W. V., *olivalis*, W. V., *costalis*, Eversm., and other allied species, with which it is also agreeing in the shape of wings and the long, porrect, pointed labial palpi.

Darjeeling, 20th July, 1886; H. J. Elwes. Sikkim interior; Möller.

[Seems common at light.—H. J. E.]

72. *Botys octonalis*, nov. spec.

A pair of 19—20 mm. expanse.

The proper place of this new *Botys* is evidently in the neighbourhood of *prunalis*, W. V., and *olivalis*, W. V., as is indicated by the dark costal striæ on the under side of the fore wings towards the apex, and among the allied species it is very distinct by the dark fuscous colour of the fore wings, and the perpendicular second transverse line, which is hardly denticulated, traced almost as generally in the *Phycitidæ*, with a regular curve in the middle, and straight upper and inferior parts. Antennæ setaceous, very minutely ciliated. Labial palpi twice as long as the head, porrected, dark fuscous, with whitish base; maxillary palpi distinct, somewhat pencil-shaped, also dark fuscous as the head and thorax. Abdomen dark grey, the segments white-margined, the under side whitish. Hind margin of fore wings regularly rounded, hardly oblique; the ground colour, described above, is more uniform in the darker female; lines slender, the first only traceable below the discoidal cell and straight, not dentated, second described above, both yellowish white. Stigmata well-sized, the orbicular oval, the reniform 8-shaped; no subterminal line, but a paler, yellowish, ill-defined patch towards the middle of hind margin; marginal line yellowish, with short, thick, black streaks in the cells. Fringes fuscous, with paler spots. Hind wings pale grey, dusted with dark grey along hind margin, broader towards the apex, two small discal spots and a discal line darker; marginal line as on hind wings, with less distinct black streaks; the fringes much paler, with a dark basal line. Under side of fore wings fuscous grey, the

costa ochreous yellow, with 4—5 dark spots towards the apex. Hind wings paler than on upper side, the discal line and spots much more distinct. Legs dark grey spotted with yellow, the middle tibiæ thickened.

Sikkim, 2—5000 ft., 6th July, 1886; H. J. Elwes.

73. *Botys illectalis.*

Botys illectalis, Walker, Cat., 18, p. 658.
Ebulea opheltesalis, Walker, Cat., 19, p. 1010.
Botys albofimbrialis, Snellen, Tyds. v. Ent., 26, p. 128.
B. niveicilialis, ib., Midden-Sumatra, Lepidoptera, p. 64.
Hedylepta illectalis, Moore, Lep. Ceyl., iii., p. 277; S. & C., No. 4345.

Sikkim interior; Möller.

74. *Botys cœnostolalis*, nov. spec.

A male of 22 mm. and a female of 16 mm. expanse.

This species reminds the genus *Cœnostala*, Led., but the palpi are as in *Botys illectalis;* it has also the same pure white fringes, with an undulated (stronger on hind wings) black basal line. The hind margin of wings is, however, more sinuated, and the fringes partly black. Palpi bicolorous, white and ochreous brown. Antennæ distinctly ciliated. Head pale fuscous. Thorax (much damaged in the male) bright ochreous yellow in the female. Apex of fore wings rather acute, the upper half of hind margin nearly perpendicular; base of wings (rubbed in the male) bright ochreous in the fresh female, fuscous along the costa; central area mixed with ochreous brown and fuscous; the discal streak black, outwardly whitish, margined in the female; the lines slender, black, the first curved, the second feebly denticulated, its upper part very oblique, as in *illectalis;* marginal area with an obscure denticulated line; the upper part of this area is ochreous, the inferior ferruginous, the hind margin itself still darker. Fringes black at the apex, in cell 3 and at anal angle of fore wings, those of hind wings unspotted. Abdomen pale fuscous, in the male with a white spot on the penultimate segment; the upper side of anal tuft also white. Under side with body and legs sordid pale ochreous (♂) or greyish (♀), the wings with traces of a slender black discal line; fore tarsi white, spotted with black.

Sikkim; Möller (♂). Java; Piepers (♀).

[According to Mr. Warren, this belongs to his genus

Leucocraspeda, and occurs in the Nilghiri Hills, where it has been found by Hampson.—H. J. E.]

75. *Botys pulchralis.*

Hydrocampa pulchralis, Moore, P. Z. S., 1867, p. 90; S. & C., No. 4430.

This species does not belong to Lederer's genus *Hydrocampa;* it might, I do not venture to say legitimize, but at least excuse the formation of a new genus, as it is endowed with a peculiar character, the costa of hind wings being widened near the base. I prefer, however, in the present case, avoiding the increase of the already too numerous genera of *Pyralidæ*, as in other respects the species is a *Botys*, A, a, Lederer, and has much conformity with *B. sambucalis* and *stachydalis*. These two well-known European species have, however, normally formed hind wings. Perhaps, on account of the above mentioned character, a new section (γ) of this division of *Botys* might be formed, as the widened costa of hind wings is common to both sexes, though it is not so accentuated in the female. The antennæ are setaceous, the labial palpi porrected, not fully twice as long as the head, bicolorous.

Darjeeling, 4th August; H. J. Elwes.

[One of the commonest species at light during the rains, sometimes in swarms.—H. J. E.]

76. *Botys scinisalis.*

Botys scinisalis, Walker, Cat., 16, p. 648; Moore, P. Z. S., 1877, p. 619, pl. 60, f. 11; S. & C., No. 4040.

Botyodes costalis, Moore, Desc. Ind. Lep., p. 221.

This species has also been captured in Java by Mr. Piepers, at an elevation of 5000—5500 ft.; the specimens do not differ from the Indian, among which some have the whole basal area and the inferior part of the central area, from the discoidal cell to the inner margin, obscurated by the iridescent fuscous of the third area. Surely no specific difference is implied by that character; but it constitutes a well-marked variety. Sometimes the pale spots in cells 3 and 4 of fore wings are also wanting.

Sikkim, 7000 ft., 20th July and 26th August, 1886; H. J. Elwes.

77. *Botys restrictalis*, nov. spec.

A male of 36 mm. expanse.

Allied to *scinisalis*, of the same size, general colour, and pattern of design; the labial palpi also recurved, narrower than the eyes, smooth, with short but distinct terminal joint. The body, however, is a little stouter, the basal area of fore wings extends farther, at the costa beyond one-fourth, at the inner margin beyond one-third. As the second line is at the same distance from hind margin as in *scinisalis*, the central area is narrower, especially its inferior half, and it is also entirely warm ochreous yellow. Palpi and head brownish grey. Antennæ setaceous, ciliated ($\frac{1}{2}$), but much shorter than in *scinisalis*, where the ciliation is $1\frac{1}{2}$. Thorax rubbed. Abdomen brownish grey with whitish venter. Shape of wings as in *scinisalis*, the basal area lustrous brownish grey, its upper part obliquely limited, the first line hardly perceptible; central area warm ochreous yellow, strongly narrowed below the discoidal cell there, and with parallel sides, the inferior parts of the first and second lines being nearly straight, not oblique, as in *scinisalis*. Discal marks as in the allied species, rather smaller; central area with a protruding part at the bases of cells 3 and 4, as in *scinisalis*, but this is concolorous, not paler; third area lustrous brownish grey, with a warm ochreous suffusion near the costa. Basal third of hind wings ochreous, not whitish, as in the allied species, suffused with grey, and with a dark grey spot; remainder of the wing and the fringes lustrous brownish grey. Under side of wings grey, the basal half whitish, limited by a distinct, flexuous dark grey discal line with dark grey discal spots, the orbicular of fore wings reduced to a point, and the space between it and the reniform concolorous, not white, as in *scinisalis*.

Sikkim; Möller.

78. *Botys fraterna*.

Botyodes fraterna, Moore, Desc. Indian Lep., p. 221, pl. 7, f. 16; S. & C., No. 4037.

This species is no *Botyodes*, Led., the antennæ being normally formed.

Sikkim; Möller.

79. *Botys consimilalis.*

Botys consimilalis, Lederer, Wien. Ent. Mon., vii., p. 471, No. 65.

Sikkim; Möller.

[Described from two bad females in Felder's collection from Ternate and Amboina.—H. J. E.]

80. *Botys angustalis*, nov. spec.

Three males of 30—31 mm. expanse.

Evidently allied to *Botys consimilalis*, Led., also narrow-winged, and with a long abdomen, the colour and pattern of design the same, but a smaller insect (expanse of *consimilalis*, 40 mm.), the costa of fore wings suffused with brownish grey, the central part of the second line not confluent with the dark border, and, instead of a straight dark stripe on hind wings, a slender, angular, discal line with distinctly denticulated central part. Dark border of hind wings also narrowing towards anal angle, hardly attaining it and denticulated basally. Palpi recurved, narrower than the eyes, their terminal joint short but visible; they are distinctly bicolorous, white and brownish grey. Antennæ two-thirds of fore wings, as in *consimilalis* and *sanguiflualis*, Lederer, *l. c.*, pl. 11, f. 1; they are setaceous, nearly bare. Thorax ochreous, mixed with brownish grey. Ground colour of wings ochreous, not so warm as that of Lederer's figure of *sanguiflualis*, the markings brownish grey; discal spots small, the first a point, the second somewhat reniform, as in the foregoing species; lines slender, the second sinuate, obtusely angular, thickened in cell 1*b*; costal suffusion covering the discoidal cell, but not reaching beyond the second line; dark border of fore wing not narrowing towards the apex. Fringes dark grey. On hind wings the upper and third parts of the discal line are somewhat suffused, and the elongated discal spot not so well separated from it as in the above-mentioned two species. Abdomen ochreous. Under side paler, marked as above.

Sikkim; Möller.

81. *Botys iopasalis.*

Botys iopasalis, Walker, Cat., 18, p. 652; *Hapalia id.*, Moore, Lep. of Ceylon, p. 337, pl. 182, f. 14; S. & C., No. 4095.

[This figure does not represent my species, as identified by Mr. Snellen, but it really refers to No. 83.*—H. J. E.]

Sikkim, 7000 ft., August, 1886; H. J. Elwes.

82. *Botys orobenalis.*

Botys orobenalis, Snellen, Tyds. v. Ent., 22, p. 211; id., 26, p. 130, pl. 7, f. 7, 7*a*.

Sikkim; Möller.

[Seems a rare species.—H. J. E.]

83. *Botys recurrens.*

Haritala recurrens, Moore, Desc. Indian Lep., p. 215, pl. 7, f. 11; S. & C., No. 4326.

Sikkim; Möller.

84. *Botys plutusalis.*

Zebronia plutusalis, Walker, Cat., 17, p. 478.
Haritala plutusalis, S. & C., No. 4325.

Sikkim; Möller. Darjeeling; Brit. Mus.

[Not uncommon at about 4000 ft.—H. J. E.]

85. *Botys demeter*, nov. spec.

A male of 30 mm. expanse.

This species is closely allied to *plutusalis*, Walker, but it is larger, the ground colour of the upper side, though apparently also shining white, is more suffused with ochreous yellow; the shining greyish white fringes are not divided by two dark lines as in that species, but have only a well-defined black basal line, sharper and not so slender as in *plutusalis;* the hind margin of wings is ochreous, not shining white. Palpi recurved, whitish, marked with two black spots. Thorax white, with ochreous yellow spots. Upper side of wings white, shining, but strongly suffused with ochreous yellow; lines also ochreous yellow, darker and brighter than in *plutusalis;* their number is five on the fore wings, three nearly straight on the basal fourth, a third, broken in two sharp angles on vein 2 and a fifth, parallel to and at some distance of,

[* *Botyodes leopardalis*, Moore, Descr. Atk., p; 221, t. 7, fig. 26, is a synonym of *B. iopasalis*, according to Mr. Warren. I have specimens from the Naga Hills which agree with Sikkim examples. —H. J. E.]

hind margin, reaching neither the costa nor the inner margin; first, third, and fourth lines with a conspicuous black spot at the costa, another round one on the disco-cellular, as in *plutusalis*. Hind wings with three lines, a short straight near the base, the discal line broken in two sharp angles, confluent with an ochreous discal streak, and a third at some distance of hind margin as on fore wings, but longer and more distinct. Under side of wings greyish white, with indistinct pale grey lines as above, and a discal spot on fore wings. Abdomen ochreous and white, with two black spots as in *plutusalis*. Legs whitish, the first pair with five black spots.

Sikkim; Möller.

86. *Botys tigrina*.

Haritala tigrina, Moore, Lep. of Ceylon, p. 312, pl. 182, f. 5; S. & C., No. 4327.

This species is also allied to *plutusalis*, but unicolorous deep ochreous yellow, only with three lines on fore wings, which each have black spot on the costa (the third line being grey, not ochreous), the discal spot is more elongate, and the fringes are shining dark grey.

Sikkim; Möller.

[A single specimen only. The figure in Moore's work does not agree with the description or with my species, as identified by Messrs. Warren and Snellen.—H. J. E.]

87. *Botys definita*.

Haritala definita, Butler.

Sikkim; Möller.

[? female of the next species.—H. J. E.]

88. *Botys onustalis*, nov. spec.

A male of 24 mm. expanse.

Palpi recurved, whitish, the outside of the second article dark grey. Upper side pure dark blackish grey, the face whitish margined, the hind margins of the abdominal segments narrowly pure white, a black spot on the penultimate, a pure white just before the black apex of the last. Fore wings with three nearly straight broad black transverse lines, all pale margined, the first and third hindward, the second basally; first line near the base, the second at one-third, somewhat oblique outwardly, the third at three-fifths, a little oblique inwardly, and with a feeble curve in the middle.

Central area of the wing marked with a black discal lunule, and a little narrowing towards the inner margin. Hind wings with a forked black discal line, which is white-margined towards hind margin; marginal line white, very pure from anal angle of hind wings upwards till vein 2 of fore wings, from thence more sordid till the somewhat paler apex of fore wings. Fringes grey, with a black basal and a slender white discal line. Under side paler, pure grey; four discal spots, and an angular discal line darker. Legs whitish, the fore tarsi purer, and the first pair of legs marked with four black spots.

This species belongs also to the group of *plutusalis*, but the wings are shorter and more ample.

Sikkim; Möller.

[Mimics *Meliasomima xuthusalis*, Wlk. (*fide* Warren). —H. J. E.]

89. *Botys ruralis.*

Phalæna ruralis, Scopoli, Entom. Carn., p. 242, No. 616.
Pyralis verticalis, Hübn , Samml. Eur. Schmett., Pyr., tab. *g*, f. 57; Wood, f. 810.

Darjeeling; H. J. Elwes. Sikkim; Möller.

90. *Botys butyrina.*

Notarcha butyrina, Meyrick, Trans. Ent. Soc. Lond., 1886, p. 260.

A bad specimen. Possibly identical with *B. paleacalis*, Guén.

Sikkim; Möller.

[Described from Fiji.—H. J. E.]

91. *Botys multilinealis.*

Botys multilinealis, Guenée, Delt. et Pyr., p. 337, pl. 8, f. 11; Lederer, Wien. Ent. Mon., vii., p. 375, pl. 11, f. 3.
Synclera multilinealis, Moore, Lep. Ceyl., iii., p. 315; S. & C., No. 4306.

Darjeeling, August, 1886; H. J. Elwes. Sikkim, Möller. Ganjam; Minchin.

[Not uncommon at 4000 ft.—H. J. E.]

92. *Botys inscisalis.*

Botys inscisalis, Walker, Cat., 34, p. 1410.
Rehimena incisalis, Moore, Lep. of Ceylon, p. 290, pl. 181, f. 1; S. & C., No. 4137.

Sikkim; Möller.

[A very easily recognised species, which seems not uncommon.—H. J. E.]

93. *Botys octomaculalis.*

Filodes octomaculalis, Moore, P. Z. S., 1867, p. 95; S. & C., No. 4223.
Rhagoba bimaculata, Moore, Desc. Indian Lep., p. 218; S. & C., No. 4231.

A somewhat variable species. In some specimens each wing is marked with two transparent white spots, in others only with one, and in still others the spot of hind wings is also wanting. It does not belong to *Filodes*, Lederer; the antennæ are not longer than in *Botys unitalis*, Guén.

Darjeeling, 22nd August; H. J. Elwes.

[A tolerably common species.—H. J. E.]

94. *Botys quadrimaculalis.*

Scopula quadrimaculalis, Kollar, in von Hügel's Kashmir, p. 492.
Coptobasis? quadrimaculalis, Lederer, Wien. Ent. Mon., vii., p. 430, pl. 16, f. 12 (♀).

Darjeeling, 20th June, July; H. J. Elwes. Sikkim; Möller.

[Not uncommon at about 5000 ft. This is not the *Botys quadrimaculalis* of Bremer and Grey and Walker, No. 4274 of Swinhoe and Cotes' Catalogue, which is recorded from Darjeeling in error, I think, by Swinhoe. —H. J. E.]

95. *Botys sordidalis.*

Haritala sordidalis, Warren MSS.

Sikkim; Möller.

[Seems rare at about 4000 ft. The type is from Sarawak.—H. J. E.]

96. *Botys unitalis.*

Botys unitalis, Guenée, Delt. et Pyr., p. 349, No. 411 ; Walker, Cat., 18, p. 655 ; S. & C., No. 4080.
B. megapteralis, Walker, Cat., 34, p. 1407.

Sikkim ; Möller.

[Occurs also in Ceram (*fide* Walker) and Silhet (Guenée).—H. J. E.]

97. *Botys opalinalis.*

Botys opalinalis, Moore, P. Z. S., 1877, p. 620.
Pachynoa opalinalis, S. & C., No. 4166.

Sikkim ; Möller.

98. *Botys credulalis*, nov. spec.

A male of 26 mm. expanse.

Palpi recurved, brownish, nearly unicolorous, as only the beginning of the base is whitish. Antennæ two-thirds of fore wings, setaceous, brownish grey. Upper side clear brownish grey, somewhat glossy, nearly unicolorous ; only the costa of fore wings after the first line is paler sordid luteous, which colour vanishes towards the apex. The markings, a comma-form discal spot of fore wings, a punctiform on hind wings, and the lines are black ; the first line is broken on costa of discoidal cell, thence perpendicular ; second line beginning at three-fourths of costa, perpendicular till a curve on vein 3, thence nearly straight and obliquely directed to two-thirds of the inner margin of hind wings ; it is a little diffused and widened on hind wings ; marginal line pale yellow, slender, distinct, basally shaded with blackish grey. Fringes blackish grey. Under side of wings much paler and purer grey, the costa unicolorous, the markings as above, less distinct. Body and legs also pale grey, but the fore tibiæ and tarsi white, with three black spots.

Sikkim, 1st May, 1888 ; Möller.

99. *Botys attemptalis*, nov. spec.

A male of 27 mm. expanse.

By its distinct markings, black marginal line, and somewhat glossy uniform luteous ground colour, this *Botys* seems to me very distinct. I do not know any closely-allied species, *paucilinealis*, Snellen, Tyds., 26, pl. 7, f. 8, 8*a*, excepted, which, however, has very different markings, more elongate wings, and an ochreous ground colour. Palpi recurved, luteous, only the base indistinctly white. Antennæ setaceous, with short ciliations. Head and upper side of body and wings luteous, the wings a little iridescent, paler

towards the inner margin of hind wings. Abdomen with a black dot on the penultimate segment ; markings nearly black, sharp, consisting in a straight first line, obliquely directed from one-fourth of costa to one-third of inner margin, in lunular discal streaks on both wings (on hind wings more slender), and in an angularly sinuous second line, which begins at three-fourths of costa with a black dot, is thence straight till vein 6, has a denticulated projection from veins 5—3, is very faint in cell 2 and again distinct, parallel with the first line, but more sinuous from vein 2 till two-thirds of inner margin. On hind wings the discal line is alike to the second of fore wings, but the inferior part is longer, straighter, directed towards the anal angle, which, however, it does not attain ; marginal line thick, black, uninterrupted from apex of fore wings till vein 1 *c* of hind wings, where it abruptly ceases; on the inner side it is narrowly margined with bright ochreous. Fringes dark grey, unicolorous, glossy. Under side paler, with similar markings as above. Body and legs whitish, the fore tibiæ with a black spot.

Sikkim ; Möller.

100. *Botys testudinalis.*

Glyphodes ? testudinalis, Saalmüller, Mittheil. Senckenberg. naturforsch. Ges., 1879, p. 297.

It is true that the anal tuft in this species is not unicolorous: it is black, with two white streaks ; but in other respects it is very alike to several other species of this section (*matutinalis*, *adipalis*, *fatualis*), and so I should rather place *testudinalis* here.

Sikkim ; Möller.

101. *Botys dissipatalis.*

Botys dissipatalis, Lederer, Wien. Ent. Mon., vii., p. 474, pl. 11, f. 13.

Samea quinquegera, Moore, Descr. Indian Lep., p. 207, pl. 7, f. 14 ; S. & C., No. 4249.

Sikkim ; Möller.

[The type was from Felder's collection from Amboina. —H. J. E.]

[102. *Botys* sp.

A single specimen of what seems to me a distinct species, and which is unknown to Mr. Warren, but not fresh enough in condition for description.—H. J. E.]

Genus Eurycreon, *v. Hein.*, Schmett. Deutschl., 2, band i., 2, p. 88 (*Botys*, Sect. B (*Eurycreon*), Led., pp. 365, 376).

103. *Eurycreon nigrescens.*

Hapalia nigrescens, Moore, Descr. Indian Lep., p. 222; S. & C., No. 4099.

This species undoubtedly belongs to *Eurycreon*, von Heinem.

Darjeeling, 20th July and 22nd August; H. J. Elwes. Sikkim; Möller.

[A rare species at Darjeeling.—H. J. E.]

Genus Parbattia, *Moore*, Descr. Ind. Lep., p. 225.

104. *Parbattia vialis.*

Parbattia vialis, Moore, Desc. Indian Lep., p. 225, pl. vii., f. 30; S. & C., No. 4538.

Sikkim; Möller.

Genus Conogethes, *Meyrick*, Trans. Ent. Soc. Lond., 1884, p. 314.

105. *Conogethes punctiferalis.*

Astura punctiferalis, Guenée, Delt. et Pyr., p. 320; S. & C., No. 4031.

Conogethes punctiferalis, Meyrick, Trans. Ent. Soc. Lond., 1884, p. 314.

Darjeeling, July, 1886. Khasia, 4000 ft.; H. J. Elwes. Sikkim interior; Möller.

[Occurs also at Brisbane, in Ceram, and China (Meyrick).—H. J. E.]

106. *Conogethes hæmactalis*, nov. spec.

A pair of 16—18 mm. expanse.

This species is smaller than, but in other respects has much conformity with, *C. punctiferalis*, the ground colour of body and wings is the same, also the pattern of the design, and the form of the palpi and antennæ. Only the dark metallic-scaled spot near the anal angle of hind wings, so conspicuous in the male of that species, is wanting in the corresponding sex of *hæmactalis*, the apex of fore wings is less acute, and the colour of the lines and disseminated spots deep blood or rather purplish red. Palpi

recurved, compressed, smooth, the third article triangular, short, as in *punctiferalis;* they are deep ochreous yellow, with a nearly black spot below the paler apex; maxillary palpi short. Antennæ setaceous, bare. Abdomen a little longer than hind wings, ochreous, with some purplish spots; anal tuft of male pale grey. Upper side of wings bright ochreous yellow, with deep blood or purplish red markings, consisting on fore wings in two irregular transverse lines and several spots, which are confluent behind the central part of the second line and towards the middle of the inner margin. Spots on hind wings less numerous and smaller, scattered over the surface, not arranged in distinct series. Basal half of fringes ochreous, dull, the second greyish, glossy. Under side pale yellow, with some blackish spots; the fore wings strongly suffused with dark grey. Legs pale yellow, the anterior pair with black spots on the tibiæ.

Sikkim; Möller.

107. *Conygethes alboflavalis.*

Conogethes alboflavalis, Moore, Descr. Indian Lep., p. 220; S. & C., No. 4030.

A single bad specimen only.

Sikkim; Möller.

[I have another from coll. Atkinson.—H. J. E.]

Genus Pionea, *Gn.*, in Cat. Dup., p. 203; *Pyralidæ*, p. 367, Led.; p. 382.

108. *Pionea forficalis.*

Pyralis forficalis, L., Syst. Nat., ed. xii., p. 882, No. 334; Hübner, Samml. Eur. Schm., Pyr., f. 58; Wood, f. 806; S. & C., No. 4172.

The specimens are rather smaller than European species, but not different in other respects.

Darjeeling, 20th July, 1886; Sikkim, 4—7000 ft., June, July; H. J. Elwes. Kulu; Young.

Genus Godara, *Walk.*, Cat., 19, p. 808 (1859); Led., p. 383.

109. *Godara comalis.*

Pionea comalis, Guenée, Delt. et Pyr., p. 368; Moore, Lep. of Ceylon, p. 348, pl. 179, f. 2, 2*a*, 2*b*.

Godara comalis, S. & C., No. 4176.

Apparently a common species. I have also seen it from South Africa, and it is abundant in Java.

Darjeeling, July; H. J. Elwes.

[Not rare in Sikkim. I have it also from the Naga Hills (Doherty) and Bangalore (Minchin).—H. J. E.]

Genus Acharana, *Moore*, Lep. Ceyl., p. 285.

110. *Acharana otreusalis.*

Botys otreusalis, Walker, Cat. 18, p. 637.

Acharana otreusalis, Moore, Lep. of Ceylon, p. 285, pl. 180, f. 11; S. & C., No. 4112.

Botys? tridentalis, Snellen, Tyds., 15, p. 89, pl. 7, f. 14, 15; id., 26, p. 133.

My *tridentalis* is the same as *otreusalis*, Moore, but the figures given in the Tydschrift are inexact in many points. The fore wings are too brownish, the base of hind wings too pale, the fringes erroneously white, the palpi of the ♂ scarlet (!). As to the formation of a new genus by Mr. Moore, this is perfectly right; but the chief argument for it is the peculiar character found on the costa of the male fore wings, and figured, *l. c.*, f. 15, as in other respects the species is a regular *Botys*. With Mr. Moore, I also do not believe that this species is the *Botys phœopteralis* of Guenée. It occurs, however, also in the West Indies; I have it from Curacao.

Darjeeling, 20th June and 20th July. Khasia, 6000 ft.; H. J. Elwes.

[The bands in Moore's figure are much more distinct than in my specimens.—H. J. E.]

Genus Cnaphalocrocis, *Led.*, Wien. Ent. Mon., vii., p. 384.

111. *Cnaphalocrocis jolinalis.*

Cnaphalocrocis jolinalis, Lederer, Wien. Ent. Mon., vii., p. 384, pl. 2, f. 13, pl. 12, f. 7.

Botys iolealis, Walk., Cat., 18, p. 666.

Cnaphalocrocis medinalis, Moore, Lep. of Ceylon, p. 281; S. & C., No. 4118.

? Salbia medinalis, Guenée, Delt. et Pyr., p. 201.

Medinalis, Guenée, is perhaps the same as *jolinalis*,

but Guenée's description, of the female only and evidently made after a bad specimen, is too vague. Lederer's name, on the other hand, is supported by a good description and sufficient figures.

Darjeeling, 4th August, 1886; H. J. Elwes.

[Described from Hong-Kong, Borneo, and Amboyna. —H. J. E.]

Genus Dolichosticha, *Meyr.*, Trans. Ent. Soc. Lond., 1884, p. 304.

112. *Dolichosticha venilialis.*

Asopia venilialis, Walker, Cat., 17, p. 373.
Dolichosticha venilialis, Meyrick, Trans. Ent. Soc. Lond., 1884, p. 304; S. & C., No. 4119.

Sikkim; Möller.

[Described from Queensland, and occurs also in Borneo. A single specimen only.—H. J. E.]

Genus Sameodes, *Snellen*, Tyds. v. Ent., 23 (1879), p. 217.

113. *Sameodes cancellalis.*

Botys cancellalis, Zeller, Micropt. Caffr., p. 34.
Samcodes cancellalis, Meyrick, Ent. Mo. Mag., 21, p. 202; id., Trans. Ent. Soc. Lond., 1886, p. 241.
S. trithyralis, Snellen, Tyds., 23, p. 218; id., 26, p. 134, pl. 8, f. 4, 4*a*, 4*b*.
S. pipleisalis, Moore, Lep. of Ceylon, p. 307, pl. 181, f. 14; S. & C., No. 4238.

Darjeeling, 21st June and 4th August; H. J. Elwes.

[Seems rare in Sikkim, but has evidently a very wide range.—H. J. E.]

Genus Crocidophora, *Led.*, Wien Ent. Mon., vii., p. 386.

114. *Crocidophora ? flavicinctalis*, nov. spec.

A male of 23 mm. expanse.

This species is closely allied to the genus *Crocidophora*, Lederer (*Crocidosema* in the Analyt. Table), only the shape of fore wings is not amygdaliform, as Lederer calls them, but *Botys*-like; however, as I do not possess any of Lederer's species, I prefer to range the present provisionally under this genus rather than to

orm a new one. Labial palpi porrected, rostriform, pointed; their base snow-white, the remainder bright ochreous brown as the distinct maxillary palpi and the white-edged front. Antennæ setaceous, almost bare, their length three-fourths of the costa of fore wings. Shape of wings as in *Botys*, especially *hyalinalis*, *flavalis;* the fore wings dark fuscous brown, with a violaceous tinge, and glossy; they are margined with ochreous yellow, narrowly along the costa, broader and suffused round the apex, and again narrow along hind margin; fringes also yellow; costa of fore wings marked at two-thirds with a brown spot, indicating the origin of the second line, which is slender, blackish grey, and continued on hind wings, where it is nearly straight till vein 5, and subsequently runs closely to hind margin; a blackish first transverse line on fore wings and a discal dot are indistinct. Hind wings greyer, also with a narrow yellow hind margin, the marginal line brown, with minute spots. Under side of wings paler and greyer, marked as on upper side, the yellow border also paler, narrower, also continued along the costa of hind wings. Legs and under side of body pale yellow; upper side of abdomen fuscous; anal tuft long, pale. The fore wings have a very short discoidal cell, and a circular depression beyond it on the bases of veins 6 and 7, which is also visible on the upper side; besides, the crest which retains the frenulum on the under side near the base of the wings is unusually strongly developed.

Sikkim interior; Möller.

115. *Crocidophora? flavicilialis*, nov. spec. (Pl. XX., figs. 5, 5*a*).

A male of 23 mm. expanse.

This species very much resembles the preceding, but the most striking difference is indicated by the name; besides, and this, as a structural character, is more important, it has no groove or depression on the base of the veins 6 and 7 of fore wings, and their discoidal cell is of normal length; at the base of the discoidal cell a small groove is visible, and the crest at the under side is as large as in *flavicinctalis*. Palpi porrected, rostriform, pointed, fully twice as long as the head, bicolorous, pure white and bright ochreous brown. Antennæ fully two-thirds of fore wings, setaceous, fuscous. Head, upper side of thorax, and fore wings bright ochreous brown, rather dull, uniform, a little violaceous on outer third; markings dark grey, very faint, consisting in two undulated lines and a reniform discal spot; the second line is retracted behind this spot; extremity of hind margin bright ochreous yellow, the

fringes paler, unspotted. Hind wings grey, with a darker discal spot, an indistinct pale central fascia, which is narrowing and vanishes below the middle; behind it a faint violet gloss is visible. Abdomen grey, the short anal tuft ochreous, the venter pale ochreous. Legs whitish. Under side of wings pale ochreous, a discal spot of fore wings dark grey, a common discal line faint, the crest at the base of fore wings pale grey, their costa suffused with dark grey; hind margin dark grey, violaceous on fore wings, narrowing and ill-defined on hind wings. Fringes yellow.

Sikkim; H. J. Elwes.

116. *Crocidophora? lutusalis*, nov. spec.

A male of 26 mm. expanse.

This species is again allied to the two preceding, but the wings are longer and narrower, the hind margin of the first pair more oblique, and their anal angle more rounded. Abdomen long, about twice as long as the inner margin of hind wings. A depression near the base of cell 1*b* of fore wings is distinct; besides, there are two longitudinal grooves behind the discoidal cell near to the costa, opposite a minute tooth-like flat process on it. Palpi porrect, rostriform, twice as long as the head, bicolorous, white and fuscous. Antennæ setaceous. Head, upper side of thorax, and wings sordid, glossy grey, the fore wings very uniform, the hind wings a little paler towards the base and whitish along the inner margin and costa; markings dark grey, but very indistinct, consisting on fore wings in two lines, a reniform discal spot, and in an angular discal line on hind wings. The second line of fore wings is retracted behind the discal spot, as in *flavicilialis*, and slightly pale margined behind. Fringes dark grey, those of hind wings whitish towards anal angle. Abdomen grey, paler towards the end, the last segment elongated, but the anal tuft itself very short. Under side of body whitish, the legs also, fore tibiæ with a black spot; under side of wings grey, whitish outwards of a faint darker discal line and on the basal half of hind wings; a crest at the base of fore wings, as in the two preceding species.

Mongpo, 2500 ft., 3rd June, 1886; H. J. Elwes.

117. *Crocidophora? limbolalis.*

Asopia limbolalis, Moore, Proc. Zool. Soc., 1877, p. 615; S. & C., No. 4256.

Sikkim; Möller.

118. *Crocidophora? amœnalis*, nov. spec.

A male of 26 mm. expanse.

Allied to *limbolalis*, but the basal half of the wings dusky, mixed with dark grey and ferruginous, the dark border of fore wings twice as broad at the costa as at the inner margin, while in *limbolalis* it is of equal width throughout, the central area of the same wings is yellow till the costa, which is brownish in the preceding species. Palpi porrect, rostriform, twice as long as the head, bicolorous, ochreous brown and white. Vertex brown, white-margined. Antennæ long, fully two-thirds of fore wings, setaceous; collar ochreous brown, thorax fuscous. Dark base of wings limited by a ferruginous line, which is very sinuous on fore wings, nearly straight (with a feeble basal curve) on hind wings. On fore wings this line basally cuts off a part of the lemon-yellow central area of the wings, which in the form of a fascia extends from the costa of fore wings till the hind margin of the second pair, where it ends, pointed in cell 1*a*; marginal part of the wings fuscous, with a strong lilac mixture, as in *limbolalis;* it is advancing a little basally on vein 2 of fore wings, and rapidly narrows on hind wings, where the basal margin is denticulated, and it is ending at vein 2, just before meeting the dark basal half of the wing. Fringes grey, with a darker inwardly pale-margined basal line. Under side of wings pale yellow, the basal half of fore wings towards the costa and their hind margin dark grey. Abdomen dark grey, with white margined segments above; below pale yellow, as the legs.

As in *limbolalis*, this species has a tuft or crest at the under side of fore wings near the base of cell 1*b*, only it is smaller, and a small depression (with a flat crest of scales) at the end of discoidal cell.

Hapalia fasciata, Moore, Desc. Indian Lep., p. 223, pl. 7, f. 20, is evidently a similarly coloured and marked species, but neither the figure nor the description do perfectly agree with my specimen of *amœnalis;* and besides, I suppose that Mr. Moore would have remarked and described the conspicuous tuft at the under side. So *fasciata* will be a *Botys*, Lederer.

Sikkim; Möller.

[Moore had a female only.—H. J. E.]

Genus Circobotys, *Butler*, Illust., 3, p. 77 (1879).

119. *Circobotys limbata*.

Circobotys limbata, Moore, Desc. Indian Lep., p. 220, pl. 7, f. 24; S. & C., No. 4123.

Sikkim interior; Möller.

120. *Circobotys? phycidalis*, nov. spec.

A pair; the ♂ 20 mm., the ♀ 22 mm. expanse.

This species may, provisionally at least, be placed in *Circobotys;* the shape of wings is nearly the same as in *limbata*, but the apex of fore wings, though strongly produced, not falcate. The antennæ of the male have an obtuse tooth-like projection at the upper side of the basal joint, and the first sixth of the shaft is curved downwards, with a tuft of scales in the curve, as in the knot-horns; the remainder is setaceous base, as the whole female antennæ are. Palpi fully twice as long as the head, rostriform, pointed, narrower than in *limbata*, and a little pilose. Front obtusely prominent. Head, thorax and fore wings luteous, mixed with grey; the costa ochreous, very narrow towards the base. Lines as in *limbata*, but more continuous and distinct. Fringes a little paler than the wing. Hind wings with fringes a trifle paler and more glossy than the front pair, the anal fourth whitish. Abdomen pale greyish ochreous, whitish beneath. Under side of wings pale grey, glossy, unmarked.

Sikkim; Möller. Mongpo, 4000 ft., 27th May, 1886; H. J. Elwes.

Genus Calamochrous, *Led.*, Wien. Ent. Mon., vii., p. 386.

121. *Calamochrous dichroma.*

Ebulea dichroma, Moore, Desc. Indian Lep., p. 223; S. & C., No. 4133.

This species may be placed in *Calamochrous*, Lederer; the front is prominent, as it is in *acutellus*, Eversm. (though Lederer does not mention it), only more rounded; the palpi are porrect, and the shape of wings nearly the same, the apex of fore wings being still more produced. Nervulation normal, the discoidal cell of fore wings fully half as long as the wing.

Sikkim, 8000 ft., 1st August, 1886; H. J. Elwes.

122. *Calamochrous brevipalpis*, nov. spec.

A male of 33 mm. expanse.

Allied to *C. dichroma;* the discoidal cell of fore wings also fully half as long as the wing, the nervulation normal, but the rostriform, bicolorous labial palpi shorter, not fully twice as long as the head. The setaceous, nearly bare, antennæ, the white-margined

front, the vertex and thorax, dull luteous. This is also the ground colour of the fore wings, which are acute, with a straight oblique hind margin; the luteous ground colour is suffused with reddish ochreous, infuscated along the costa, and the discoidal cell marked with two cloudy brick-red spots. Basal half of fringes dark grey, the outer pure white. Hind wings with fringes pale amber-yellow, somewhat lustrous, suffused with grey along the costa. Under side pale yellow; a discal streak and suffusion along the costa of fore wings dark grey. Legs whitish.

Sikkim; Möller.

Genus Stenophyes, *Led.*, Wien. Ent. Mon., vii., p. 388.

123. *Stenophyes gratiosalis.*

Samea gratiosalis, Walker, Cat., 17, p. 357; S. & C., No. 4246.

The shape of wings in this species is about the same as in *Stenophyes serinalis*, Walker, Lederer.

Sikkim; Möller.

[The type of this species is from Ceylon.—H. J. E.]

124. *Stenophyes histricalis.*

Botys histricalis, Walker, Cat., 18, p. 655.
Cotachena histricalis, Moore, Lep. Ceyl., iii., p. 276; S. & C., No. 4355.

Wings more *Botys*-like than in *serinalis*, *gratiosalis*, but still elongate; also the abdomen.

Sikkim; Möller.

[Occurs also in Ceylon and China.—H. J. E.]

Genus Polythlipta, *Led.*, Wien. Ent. Mon., vii., p. 389.

125. *Polythlipta ossealis.*

Polythlipta ossealis, Lederer, Wien. Ent. Mon., vii., p. 389, pl. 12, f. 18; *osseatalis*, id., p. 477, No. 93.

Sikkim; Möller.

[The type, from Amboina, is in Felder's collection. Seems rare in Sikkim.—H. J. E.]

126. *Polythlipta cerealis.*

Polythlipta cerealis, Lederer, Wien. Ent. Mon., vii., pp. 389 and 477; Feld. & Rogenh., Novara, ii., 2, pl. 135, f. 34.

Glyphodes vagalis, Walker, Cat., 34, p. 1356; S. & C., No. 4196.

Sikkim; Möller.

[A common species at low elevations.—H. J. E.]

127. *Polythlipta peragrata.*

Polythlipta peragrata, Moore, Desc. Ind. Lep., p. 216, pl. vii., f. 15; S. & C., No. 4195.

Sikkim, 6000 ft., 29th May, 1886; H. J. Elwes.

128. *Polythlipta? vinaceali.**

Botys vinaccalis, Moore, P. Z. S., 1877, p. 619.

Charema vinaccalis, S. & C., No. 4236.

Polythlipta albicaudalis, Snellen, Tyds., 23, p. 221; id., 26, p. 137, pl. 8, f. 7, 7*a*.

This species is no *Botys*, but also not a true *Polythlipta*, and the formation of a new genus for it would be very suitable. I also note that the figure in the 'Tydschrift' is insufficient, the colour being much too reddish.

Sikkim; Möller.

[Seems fairly common at low elevations. This belongs to the genus *Tetredia*, Warren MSS.—H. J. E.]

Genus Filodes, *Gn.*, Pyr., p. 317; Led., p. 389.

129. *Filodes fulvidorsalis.*

Pinacia fulvidorsalis, Geyer, in Hübner, Zutr. 4-tes Hundert, p. 15, f. 643, 644.

Filodes fulvidorsalis, Guenée, Delt. et Pyr., p. 317; Lederer, Wien. Ent. Mon., vii., p. 390, pl. 12, f. 17; Snellen, Tyds., 26, p. 137; Moore, Lep. of Ceylon, p. 331, pl. 182, f. 2, 2*a*; S. & C., No. 4220.

[* *Thliptoceras calvatalis*, Swin., Trans. Ent. Soc. Lond., 1890, p. 275, is said to occur at Darjeeling, but an imperfect specimen lent me by Col. Swinhoe cannot be distinguished from the above. —H. J. E.]

F. patruclis, Moore, Desc. Indian Lep., p. 218; S. & C., No. 4224.

Var. *Auxomitia mirificalis*, Lederer, Wien. Ent. Mon., vii., p. 391, pl. 13, f. 1.

Geyer's figure of this species does not agree with the text. The thorax, the base of fore wings, and the abdomen are, in fresh typical species, indeed fulvous ("hoch goldgelb," as the description intimates), not pale greenish ochreous yellow. I also must observe that in all my specimens the base of hind wings is concolorous with the rest, dark grey, not yellow. Lederer's figure, too, is insufficient, and though he says that in his specimen the abdomen was wanting, he figures it with a fancy-male one. Then I must point to a serious mistake of this otherwise so very sharp-sighted and conscientious author. Evidently not being acquainted with the male of *fulvidorsalis*, he was unaware of the absence of vein 8 in the hind wings (see my note, 'Tydschrift,' *l. c.*), as well as of the various other curious characters displayed by that sex, and described, as another genus and species (*Auxomitia mirificalis*), a variety of *Filodes fulvidorsalis* from the Nicobar Islands, which occurs also in Sikkim, and in which the thorax, the base of fore wings, and the abdomen do not show the bright fulvous colour of the type, but a luteous one. Perhaps Geyer's figure was drawn after a transitional specimen between the type and the said variety. All the characters of Lederer's *mirificalis*, of which he also had only one specimen without abdomen, but nevertheless figures this part on his plate, are those of the male sex of *fulvidorsalis*. The genus *Auxomitia* thus must be wholly dropped.

Mr. Moore's *patruelis* seems to be the transitional variety between the type and *mirificalis*. The oblique transverse discal black fascia is also found in the type, though often indistinct.

Sikkim; Möller (var. *mirificalis*).

[Seems to be not an uncommon species in Sikkim, where I have taken both varieties; the type occurs as high as 10,000 ft. Occurs also in Java, Calcutta, East Pegu, and Silhet.—H. J. E.]

130. *Filodes sexpunctalis*, nov. sp. (Pl. XX., figs. 6, 6*a*).

Four specimens of 40—43 mm. expanse.

This species comes very near to *fulvidorsalis*, but is different by the still deeper fulvous colour of head, thorax, base of fore wings, and abdomen; then the base of each fore wing is only marked with three, though larger, black spots (in *fulvidorsalis*, six); no traces exist of a black discal line, which, indeed, is often indistinct in the allied species, and the under side of the wings is unmarked, blackish grey, only with the metallic line along the costa of fore wings, as in *fulvidorsalis*. Palpi and front nearly black; vertex deep bright fulvous. Antennæ luteous white, infuscated towards the base. Thorax bright fulvous, unspotted. Wings dull, black; cell 12 of fore wings with a line of bluish metallic scales from the base till the middle; the fulvous base of the fore wings with three black spots, one the origin of the subcostalis (vein 12), the second and third at the limit of the fulvous patch, at one-third of discoidal cell, and one-fifth of cell 1*b*. Fringes concolorous, a little glossy. Fulvous upper side of abdomen with three rows of seven (♂), or six (♀) black and steel-blue spots, the last segment with blackish grey apex (♀) or deep steel-blue anal tuft (♂); sides and venter slate-grey, glossy. Legs blackish grey, the tarsi sordid yellowish white; fore legs not quite so hairy as in *fulvidorsalis*. Vein 8 of hind wings, present in the female, is also absent in the male of this new species, but there is no oblique transverse veinlet between the veins 6 and 7, as in *fulvidorsalis*.

Darjeeling, 20th July—4th August; H. J. Elwes.

[This was a very common species at light in Darjeeling, and no doubt exists in many collections under the name of *fulvidorsalis*.—H. J. E.]

131. *Filodes ? nigrolinealis.*

Filodes nigrolinealis, Moore, P. Z. S., 1867, p. 95 (♀); S. & C., No. 4222.

Nigrolinealis is not strictly congeneric with the two foregoing species; the antennæ are not quite as long as the fore wings, vein 8 of hind wings is present in the male, the fore legs normal.

Darjeeling, 20th June, 1886; H. J. Elwes.

[The male has a thick tuft of pure white hairs at the end of the abdomen.—H. J. E.]

132. *Filodes? fascialis.*

Propachys fascialis, Moore, P. Z. S., 1867, p. 665; S. & C., No. 4726.

Certainly congeneric with the preceding species. Vein 8 of hind wings is present.

Sikkim, 8th April, 1888, ♂; Möller.

[A rare species.—H. J. E.]

133. *Filodes? striolalis*, nov. spec.

A female of 24 mm. expanse.

Labial palpi recurved, narrow, smooth, the third joint as long as two-thirds of the second, slender, rather pointed; maxillary palpi small, filiform. Wings and body elongate; the colour of head, thorax, abdomen, and wings pale ochreous, smooth, somewhat shining, especially the hind wings, which are a little transparent. Fore wings marked with two series of longitudinal black strigæ in the cells, situated at the place of the ordinary lines, the first feebly recurved, the second much stronger. Hind margin of hind wings broadly fuscous; fringes ochreous. Under side paler, marked as above. Legs ochreous.

Sikkim; Möller.

[This must be very rare, as only a single bad specimen was in Möller's collection.—H. J. E.]

[134. *Tyspanodes flaviventer*, Warren MSS.).

A specimen in the British Museum from Darjeeling, ex. coll. Lidderdale.—H. J. E.]

Genus Pachynoa, *Led.*, Wien. Ent. Mon., vii., p. 391.

135. *Pachynoa thoosalis.*

Botys thoosalis, Walker, Cat., 18, p. 737.
Pachynoa thoosalis, S. & C., No. 4170.
P. Walkeri, Lederer, Wien. Ent. Mon., vii., p. 391, pl. 13, f. 2.

I do not consider Lederer's alteration of Walker's name as admissible.

Sikkim; Möller.

[Lederer's type was from Amboina; Walker's had no locality.—H. J. E.]

136. *Pachynoa spilosomoïdes.*

Pitacanda spilosomoïdes, Moore, Lep. of Ceylon, p. 334, pl. 183, f. 10, ♂; S. & C., No. 4125.

This species has all the characters of *Pachynoa*, Led.

Sikkim; Möller. Bangalore.

[The species, as figured by Moore, differs from my Sikkim female in being smaller, and having a black spot on inner margin of hind wing; mine has instead a row of black marks near the outer margin. A male from Barrackpore has both these markings, and is intermediate in size.—H. J. E.]

Genus Dysallacta, *Led.*, p. 393.

137. *Dysallacta negatalis.*

Phalangiodes? negatalis, Walker, Cat., 17, p. 468.

Dysallacta negatalis, Lederer, Wien. Ent. Mon., vii., p. 393, pl. 13, f. 6; S. & C., No. 4143.

Sikkim; Möller.

Genus Botyodes, *Guen.*, Delt. et Pyr., p. 320; Led., p. 394.

138. *Botyodes asialis.*

Botyodes asialis, Guenée, Delt. et Pyr., p. 321; Lederer, Wien. Ent. Mon., vii., p. 394, pl. 5, f. 6, pl. 13, f. 8*f*; Moore, Lep. of Ceylon, p. 335, pl. 183, f. 1, 1*a*; S. & C., No. 4034.

Darjeeling, July, August; H. J. Elwes. Sikkim; Möller.

[A common species at light at Darjeeling.—H. J. E.]

Genus Endocrossis, *Meyr.*, Trans. Ent. Soc. Lond., 1889, p. 515.

139. *Endocrossis flavibasalis.*

Botyodes flavibasalis, Moore, P. Z. S., 1867, p. 95; Felder & Rogenh., Novara, ii., 2, pl. 135, f. 4; S. & C., No. 4036.

Sikkim; Möller.

[Seems common at lower elevations than the last.—H. J. E.]

Genus Hoterodes, *Gn.*, Delt. et Pyr., p. 211 ; Led., p. 394.

140. *Hoterodes ? cinerealis.*

Hoterodes cinerealis, Moore, P. Z. S., 1867, p. 94 ; S. & C., No. 4217.

Also not a true *Hoterodes*, and requiring the formation of a new genus.

Darjeeling, July, August ; H. J. Elwes. Sikkim ; Möller.

[There is a great difference between the length of the antennæ in the sexes of this species not mentioned by Moore ; the anal tuft is not yellow, as he says, only a little yellowish at the tip. The females were very common at light at Darjeeling, the males much less numerous. —H. J. E.]

Genus Nevrina, *Gn.*, Delt. et Pyr., p. 313 ; Ld., p. 395.

141. *Nevrina Procopia.*

Pyralis Procopia, Cramer, iv., p. 152, pl. 368, f. E.
Neurina Procopialis, Guenée, Delt. et Pyr., p. 314.
N. Procopia, Moore, Lep. of Ceylon, p. 330 ; S. & C., No. 4219.

Sikkim ; Möller.

[Common at low elevations.—H. J. E.]

Genus Cydalima, *Led.*, Wien. Ent. Mon., vii., p. 397.

142. *Cydalima conchylalis.*

Margarodes conchylalis, Guenée, Delt. et Pyr., p. 303, pl. 8, f. 9.
Cydalima conchylalis, S. & C., No. 4200.

Darjeeling, 22nd August, 1886 ; H. J. Elwes. Sikkim ; Moller.

[Common at light.—H. J. E.]

143. *Cydalima laticostalis.*

Margarodes laticostalis, Guenée, Delt. et Pyr., p. 303.
Cydalima laticostalis, Moore, Lep. of Ceylon, p. 326, pl. 182, f. 4 ; S. & C., No. 4201.

Sikkim ; Moller.

144. *Cydalima Elwesialis*, nov. spec. (Pl. XIX., figs. 1, 1*a*).

Three males of 33, 36, and 37 mm. expanse.

For the generic characters of this species I refer to Lederer's "Beitrag zur Kenntniss der Pyralidinen," Wien. Ent. Mon., vii., p. 397. They are all present and well-defined, though the Phycid-like curve of the antennæ, as Lederer calls it, is rather feeble, not so conspicuous as in *conchylalis;* besides, there is a tooth-like projection on the fore side of the hamper of the antennæ, just above the basal article. The antennæ are each inserted on a flat depression, and, as in *conchylalis*, very minutely ciliated, pale brownish grey, their basal article violet, with a coppery lustre. Labial palpi only a good third longer than the head, the first article sordid white, the other two, like the maxillary palpi and the face, violet with coppery lustre. Collar as the face, with a whitish summit. Thorax and tegulæ white, with some coppery brown scales at their bases. Wings shaped as in *conchylalis* male, the apex of fore wings less pointed and produced, the hind margin not so straight and oblique; hind wings more triangular. Colour of wings white, somewhat transparent and glossy, with iridescent reflections. Costa of fore wings deep greyish brown, more violet at the base, and adorned with coppery metallic scales; the grey-brown attains the apex of the wing, narrowing gradually from the base, where it occupies the whole basal half of the discoidal cell, and is not so sharply defined, but more greyish than towards the base; a white spot at the half of the discoidal cell emarginates the costal stripe a little, but a white more or less dark-edged lunule on the transverse veinlet lies nearly totally outside of it; hind margin grey, about 2 mm. wide, inwardly well-defined and straight, not attaining the anal angle of hind wings; marginal line strong, brilliantly metallic-grey, reminding the lustre of nickel; it is not perfectly continuous, and begins at vein 1*c* of hind wings with the grey border. Hind wings with a grey lunule on the disco-cellular. Abdomen whitish, with a long pencil-like anal brush of nearly black hairs; it is pointed, as the white one of *conchylalis*, not expanded, as in the males of *Phakellura*. Under side of wings nearly as above, the costa of fore wings darker than on upper side; cell 8 of hind wings also grey, but the hind margin and its metallic ornament less distinct; ciliæ greyish white. Legs sordid white, the front side of the first pair coppery violet, with pure white tarsi.

This species differs from *conchylalis* and *laticostalis* by the narrower costa of fore wings, by the broadly grey and brilliantly metallic-marked hind margin of all wings.

The teeth at the base of the antennæ and the blackish anal brush are also wanting in both species. According to Guenée, *Cydalima nitidicostalis* is larger (41 mm.), and has a dark-scaled nervulation.

Sisyrophora Pfeifferæ, Lederer, p. 399, taf. 12, f. 13, must also be an allied species, but the figure shows a somewhat more robust insect, with smaller hind wings and entirely dark collar. Besides, the figure which Lederer gives of the basal part of the antennæ (taf. 5, fig. 8) is different, and the "rauhe Beschuppung am Fuhlerschaft" is wanting. He also says nothing of a depression of the vertex, though it is conspicuous in *Elwesialis*.

Dedicated to H. J. Elwes, Esq.

Sikkim; Moller (one specimen of 33 mm.). Sumatra, Deli; Schagen van Leeuwen (the other two).

[This must be a common species from the number in Moller's collection, but I never took it myself. It occurs, however, at Mongpo, 4000 ft., and in Bhutan. I have also two specimens from the Naga Hills.—H. J. E.]

Genus Pachyarches, *Led.*, Wien. Ent. Mon., vii., p. 398.

145. *Pachyarches psittacalis.*

Parodes psittacalis, Hübner, Zuträge, 3-tes Hundert, p. 30, f. 523, 524.
Margarodes psittacalis, Guenée, Delt. et Pyr., p. 308.
Pachyarches psittacalis, S. & C., No. 4213.

Sikkim; Moller.

[Not uncommon at low elevations. Occurs also in China and the Khasia and Naga Hills.—H. J. E. [

146. *Pachyarches vertumnalis.*

Margarodes vertumnalis, Guenée, Delt. et Pyr., p. 309.
Pachyarches vertumnalis, S. & C., No. 4215.

Mr. Warren's opinion is that *Margarodes squamopedalis*, Guenée (*Enchocnemidia squamopedalis*, Led.)' might be the male of *vertumnalis*, Guenée. This is perhaps right; I have no male of *vertumnalis*.

Sikkim; H. J. Elwes.

147. *Pachyarches amphitritalis.*

Margarodes amphitritalis, Guenée, Delt. et Pyr., p. 307.
Pachyarches amphitritalis, S. & C., No. 4209.

I never have seen the male of this apparently rare but widespread species. According to Lederer, it belongs to *Pachyarches*.

Sikkim; Möller.

Genus Margaronia, *Hübn.*, Verz., p. 358; Walk., Cat., 18, p. 518 (*Margarodes*, Guen., Led., p. 398).

148. *Margaronia fallacialis*, nov. spec.

A male of 32 mm. expanse.

This species has very much the appearance of *Pachyarches psittacalis*, but the antennæ are normally formed, without a tooth-like projection of the basal article or curve at the base of the hamper (see Lederer, Wien. Ent. Mon., vii., pl. 5, f. 7 (not fig. 6)), and there is no fold at the under side of the costa of fore wings; so the species belongs to *Margaronia* (*Margarodes*, Lederer). Palpi porrected, rostriform, bicolorous, white and brown. Antennæ green, minutely ciliated. Head, upper side of thorax, abdomen, and wings bright green, as in *psittacalis* and *Enchocnemidia squamopedalis*, the edge of costa of fore wings brownish, the dots on the disco-cellular hardly visible; no marginal dots or other markings. Fringes dark grey, shining; anal tuft black. Under side of wings pale glaucous green, greyish towards the hind margins, as in *psittacalis*, but the costa of fore wings nearly concolorous, only very slightly greyish; base of wings and body paler and more bluish, again as in *psittacalis;* middle and hind coxæ and tibiæ pale bluish green; fore coxæ mixed with ochreous, the tibiæ with a black spot; all tarsi greyish white.

As the name *Margarodes* is preoccupied in the Hemiptera, I accept, following Walker and Moore, the name *Margaronia* of Hübner's 'Verzeichniss'; but it is my opinion that in other cases the so-called generic names of that much antidated Catalogue never can take priority over those of serious works. Hübner's 'Verzeichniss' is, as Zeller very justly observes, a mere name-store (Namen-magasin), without scientific value.

Sikkim; Möller.

149. *Margaronia aquosalis.**

Margarodes aquosalis, Snellen, Lepidoptera, in Reise in Midden-Sumatra, p. 66; id., Tyds. voor Ent., 26, p. 141.

Sikkim; Möller.

[Not uncommon at low elevations.—H. J. E.]

150. *Margaronia unionalis.*

Pyralis unionalis, Hübn., Samml. Eur., Schmett., Pyral., p. 132; Millière, Icones, ii., 12e livraison, p. 39, pl. 55, f. 3—6.

Sikkim; Möller. Darjeeling; H. J. Elwes.

151. *Margaronia nigropunctalis.*

Margarodes nigropunctalis, Bremer, Lep. Ost.-Sibir., p. 67, pl. 6, f. 5 (1864).

Margaronia ncomera, Butler, Illustr., ii., p. 57. pl. 39, f. 5 (1879).

Perhaps Boisduval's *quinquepunctalis*, 'Faune de Madagascar,' Bourbon et Maurice, p. 117, pl. 16, f. 5, Guenée, 'Réunion,' p. 65, is also the same as Bremer's species, and then the oldest name; but I strongly suspect *nigropunctalis* only to be a variety of *unionalis*. Strongly-marked specimens of the former, in fact, look very different, but in others (*ncomera*, Butler) with small dark spots, only the dark line parallel to the hind margin remains as a distinctive character, and this line, too, is very faint in some specimens. I did not find any structural differences.

Sikkim, Tonglo, 10,000 ft., July; H. J. Elwes. Sikkim interior; Möller. Bhutan, Sept.; id.

152. *Margaronia celsalis.*

Botys celsalis, Walk., Cat., 18, p. 654.

Margaronia celsalis, Moore, Lep. of Ceylon, p. 325, pl. 181, f. 4; S. & C., No. 4205.

Khasia Hills, 6000 ft.; H. J. Elwes. Sikkim; Möller.

[* This appears to be the same as the species identified by Swinhoe with *Margaronia marthesiusalis*, Walk., Cat., xviii., p. 531 (1859), and agrees with the description of it. *Margaronia hilaralis*, Walk., *l. c.*, p. 532, may also be the same.—H. J. E.]

153. *Margaronia lativitta.*

Pitama lativitta, Moore, Descr. Indian Lep., Atk. p. 217, pl. vii., f. 21.

A male.

Mongpo, Sikkim; Gammie.

This species has all the principal generic characters of *Margaronia* (*Margarodes*, Led.). I do not perceive anything aberrant, nor does Mr. Moore point to a distinct character in his description.

Genus Enchocnemidia, *Led.*, Wien. Ent. Mon., vii., p. 399.

154. *Enchocnemidia squamopedalis.*

Margarodes squamopedalis, Guenée, Delt. et Pyr., p. 309, No. 335, ♂.

Enchocnemidia squamopedalis, Lederer, Wien. Ent. Mon., vii., p. 399, pl. 13, f. 12.

See above, No. 136, *Pachyarches vertumnalis*, Guenée.

Sikkim; Möller. Barrackpore, 29th July, 1886; Minchin. Car Nicobar; Doherty.

[Described by Guenée from Cape of Good Hope, and recorded by Lederer from Amboina.—H. J. E.]

155. *Enchocnemidia phryneusalis.**

Margaronia phryneusalis, Walker, Cat., 18, p. 531.

Enchocnemidia phryneusalis, Moore, Lep. of Ceylon, p. 328, pl. 18, f. 12; S. & C., No. 4204.

Sikkim; Möller.

[I do not know how to distinguish this from the last; neither Walker or Moore seem to have been acquainted with it. I suspect them to be identical.—H. J. E.]

Genus Phakellura, *Lansd.*, cf. Guen., Delt. et Pyr., p. 294; Led., p. 400.

156. *Phakellura indica.*

Eudioptis indica, Saunders, Trans. Ent. Soc. Lond., new series, i., p. 163, pl. 12, f. 5—7.

Phakellura Gazorialis, Guenée, Delt. et Pyr., p. 297, No. 304.

P. indica, S. & C., No. 4197.

* The male of *phryneusalis* has no tufts at the hind legs, as *squamopedalis*, and the under side of hind wings is much more hairy.

Phakellura translucidalis and *superalis*, Guenée, are also said to occur in India, but I presume they are only found in America.

Darjeeling, 4th August, 1886; H. J. Elwes.

[Not uncommon at 4—7000 ft.—H. J. E.]

Genus Glyphodes, *Guen.*, Delt. et Pyr., p. 292; Led,, p. 401.

157. *Glyphodes Zelleri.*

Glyphodes Zelleri, Lederer, Wien. Ent. Mon., vii., p. 478, pl. 478, pl. 14, f. 3.

The white markings on fore wings more reduced, and the black margin of hind wings broader, especially towards the anal angle, than in Lederer's figure.

Sikkim; Möller.

[The type was from Amboina. The species is nearest to *bicolor*, from which it is distinguished by the broad border of the hind wing and white fringe of the hind angle of the fore wing.—H. J. E.]

158. *Glyphodes bicolor.*

Botys bicolor, Swainson, Zool. Illustr., 1st ser., 2, pl. 77, f. 2.
Glyphodes diurnalis, Guenée, Delt. et Pyr., p. 294, No. 300, pl. 5, f. 5.
G. bicolor, S. & C., No. 4178.

Sikkim; Möller.

[A common species at low elevations.—H. J. E.]

159. *Glyphodes conclusalis.*

Glyphodes conclusalis, Walker, Cat., 34, p. 1354; S. & C., No. 4182.

This species is allied to *bicolor*, but it is larger, and the fringes of fore wings entirely dark grey.

Sikkim; Möller.

160. *Glyphodes bivitralis.*

Glyphodes bivitralis, Guenée, Delt. et Pyr., p. 293; Moore, Lep. of Ceylon, p. 322, pl. 180, f. 2, 2*a*; S. & C., No. 4179.

Sikkim; Möller.

[Fairly common at low elevations.—H. J. E.]

161. *Glyphodes crithealis.*

Desmia crithealis, Walk., Cat., 17, p. 344.

Glyphodes chilka, Moore, Descr. Indian Lep., p. 216, pl. 7, f. 9; S. & C., No. 4181.

Sikkim; Möller.

[Not uncommon at low elevations. The type was from China.—H. J. E.]

162. *Glyphodes stolalis.*

Glyphodes stolalis, Guenée, Delt. et Pyr., p. 293, pl. 3, f. 11; S. & C., 4189.

Sikkim, 8000 ft., 1st August, 1886; H. J. Elwes. Sikkim; Möller.

163. *Glyphodes nyctealis.*

Glyphodes nyctealis, Snellen, Lepidoptera, in Reize in Midden-Sumatra, p. 68.

Glyphodes zelimalis, Moore, Lep. of Ceylon, p. 657, pl. 215, f. 6, is an allied species.

Darjeeling, July and 4th August; H. J. Elwes.

164. *Glyphodes naralis.*

Glyphodes naralis, Feld, & Rogenh., Novara, ii., 2, pl. 136, f. 38.

Sikkim; Möller.

[Rare at about 4000 ft.—H. J. E.]

165. *Glyphodes pyloalis.*

Glyphodes pyloalis, Walker, Cat., 19, p. 973; Moore, Lep. of Ceylon, p. 321, pl. 180, f. 3; S. & C., No. 4188.

G. sylpharis, Butler, Illustr, 2, p. 57, pl. 39, f. 2.

Sikkim interior ; Möller.

[Walker's type was from North China.—H. J. E.]

166. *Glyphodes cæsalis.*

Glyphodes cæsalis, Walker, Cat., 17, p. 499.
Synclera cæsalis, Moore, Lep. of Ceylon, p. 316, pl. 183, f. 7 ; S. & C., No. 4304.
Glyphodes crameralis, Snellen, Lepidoptera, in Midden-Sumatra, p. 69.

This species was rightly placed in *Glyphodes* by Walker.

Sikkim; Möller.

[Not uncommon at low elevations.—H. J. E.]

167. *Glyphodes sexpunctalis.*

Oligostigma sexpunctalis, Moore, P. Z. S., 1877, p. 616, pl. 60, f. 12.
Talanga sexpunctalis, Moore, Lep. of Ceylon, p. 300, pl. 181, f. 13 ; S. & C., No. 4414.
Glyphodes lomaspilalis, Snellen, Tyds. v. Ent., 23, p. 223 ; id., 26, p. 144, pl. 8, f. 12.
Cataclysta nympha, Butler, P. Z. S., 1880, p. 683.

Darjeeling, 20th July and 4th August, 1886 ; H. J. Elwes. Naga Hills ; Doherty.

[Common at light at Darjeeling.—H. J. E.]

168. *Glyphodes lacustralis.*

Glyphodes lacustralis, Moore, P. Z. S., 1867, p. 93, pl. 7, f. 11 ; S. & C., No. 4185.

Darjeeling, 20th June, 1886 : H. J. Elwes. Sikkim, 5—7000 ft., 7th July, 1886 ; id., Sikkim ; Möller.

[One of the most abundant species in Sikkim at light. —H. J. E.]

169. *Glyphodes luciferalis.*

Glyphodes luciferalis, Walker, Cat., 34, p. 1412 ; S. & C., No. 4186.

Sikkim ; Möller.

Genus Pagyda, *Walk.*, Cat., 17, p. 487.

170. *Pagyda salvalis.*

Pagyda salvalis, Walker, Cat., 17, p. 487; Moore, Lep. of Ceylon, p. 314, pl. 182, f. 6; S. & C., No. 4330.

Sikkim; Möller.

171. *Pagyda lustralis*, nov. spec.

A male of 26 mm. expanse.

This species is very distinct by its clear yellow, shining, brass-like ground colour, and the metallic lustre of a line running along the hind margin of the wings. Palpi formed as in *salvalis*, pale olive-brown, with a pure white base. Antennæ testaceous. Body concolorous with the wings, the apical fourth of the abdomen ochreous brown, with two clear white spots; anal tuft pale grey. Hind wings not quite as shining as the fore wings; all wings with two slender pale brown lines, outwardly margined with metallic scales; the first line of fore wings straight, the second twice obtusely broken on vein 3; lines of hind wings straight, parallel, the first at one-third, ending before the rounded anal angle, the second at two-thirds, running from vein 6 to the end of vein 3; metallic line along hind margin basally margined by another olive-brown one; marginal line itself pale brown, distinct. Fringes long, silky, pale yellow, lustrous, on hind wings with a slightly darker basal line. Under side pale straw-yellow, the outer margins narrowly fuscous; fore wings with a distinct, slender, dark streak on the disco-cellular. Legs pale yellow, the front and middle tibiæ and the tarsi pure white on the outside; fore tibiæ with a pale olive-brown spot.

Sikkim; Möller.

172. *Pagyda arbiter.*

Botys arbiter, Butler, Illustr., iii., p. 77, pl. 59, f. 13.

The genus *Pagyda* is not a very distinct one, but if it be maintained, then *arbiter*, Butl., must be considered as a species of it. I think that the proper place of *Pagyda* is here, and that it forms a link between *Botys* and *Glyphodes*.

Sikkim; Möller.

Genus Heterocnephes, *Led.*, Wien. Ent. Mon., vii., p. 402.

173. *Heterocnephes reniferalis*, nov. spec.

Three males and a female of 26—28 mm. expanse.

Allied to *acamasalis* (*Chabula*), Walker, Moore, Lep. of Ceylon, p. 317 = *strangulalis*, Snellen, Tyds., 23, p. 224; 27, p. 35, pl. 3, f. 1, 1*a*; all generic characters and the shape of wings the same, but a larger insect, the ground colour more brownish, the clear part is not so pure white, though also a little iridescent, the second large white spot of fore wings more distinctly reniform; no white fascia after the white line behind the said spot; on hind wings the dark discal streak confluent below with the discal fascia, and after the white line, which is limiting this fascia behind no white spot, but an ill-defined pale yellowish patch. Labial palpi whitish, with two black spots; front black, white-edged. Thorax brownish grey, with longitudinal white lines. Ground colour of wings fuscous, darkest in the middle, pale along costa of fore wings; basal fourth of fore wings with two or three (the second wanting or indistinct in two specimens), outwardly oblique, straight white lines; after the last an elongated white fascia, extending from the costa to cell 1*b*, in one specimen connected by a pale luteous line with the inner margin; beyond the middle a large, reniform, black-margined, iridescent white spot, extending from costa to vein 2, and between it and the first fascia a luteous C on vein 1; after the reniform spot a black-margined transverse white line, widening at the costa and also a little at inner margin, as in *acamasalis*, but less undulated; marginal fourth of wing pale olivaceous grey, uniform; marginal line black. Basal half of hind wings white, a little transparent, with an indistinct black line along inner margin, a black discal streak, connected with an undulated black discal fascia by means of a projection of this in cell 2; behind the black fascia is a white discal line, running from two-thirds of costa to anal angle; opposite the discoidal cell it is narrower; marginal third of wing fuscous, with an elongate pale luteous patch, pointed towards anal angle. Fringes yellowish white, with an interrupted black discal line, which is diffused at the apices and in cells 2—4 of all wings. Abdomen dark grey, indistinctly marked with white. Under side of wings marked nearly as the upper side, not so distinctly.

The genus *Chabula*, Moore, may be united to *Heterocnephes*; there are no perceptible differences.

Sikkim; Möller.

[This seems to be most nearly allied to *Glyphodes Pryeri*, Butler, from Japan.—H. J. E.]

Genus Pygospila, *Guen.*, Delt. et Pyr., p. 312; Led., p. 404.

174. *Pygospila tyres.*

Pyralis tyres, Cramer, Uitl. Kap., iii., p. 124, pl. 263, c.
Pygospila tyres, Lederer, Wien. Ent. Mon., vii., p. 404; id., Moore, Lep. of Ceylon, p. 320 (part); S. & C., No. 4218.
P. tyrealis, Guenée, Delt. et Pyr., p. 312.

Pygospila tyres is not at all the same as *Lomotropa costiflexalis*, Guenée, though the females have some likeness together. Guenée, who has both species in one genus (*Pygospila*), positively says, "L'une est pourvue de plusieurs appendices très remarquables qui manquent totalement chez l'autre." Indeed, the males are quite different, and Lederer, in conformity with his system, very rightly based on the striking sexual characters the genera *Pygospila* and *Lomotropa* (Wien. Ent. Mon., vii., *l. c.*). To this description of the genus *Pygospila* may still be added that the anal tuft of *tyres* male is thick and clubby, quite different from the long and pointed abdomen of *costiflexalis* male.

The females, too, are not so very difficult to separate; the ground colour of the upper side is in *tyres* nearly black, with a strong violet gloss, without transparent streak in cell 2 of fore wings, with a *broad square* dark spot on the disco-cellular of hind wings, very distinctly limited transparent violaceous-white spots and slender white lines on the thorax. The ground colour of *costiflexalis* female is much paler, hardly more than violaceous fuscous, the violaceous-white spots are diffused; cell 2 of fore wings is marked with a distinct transparent white streak, the disco-cellular of hind wings with a narrow dark streak, and the thorax with ochraceous lines. I note this because some entomologists are still uniting these two very distinct species.

Darjeeling, 20th July and 4th August, 1886; H. J. Elwes. Sikkim, 8000 ft.; id. Tonglo, Sikkim; Möller.

[A common species up to 10,000 ft.—H. J. E.]

Genus Nosophora, *Led.*, Wien. Ent. Mon., vii., p. 407.

175. *Nosophora chironalis.*

Botys chironalis, Walker, Cat., 18, p. 683.
Nosophora chironalis, Lederer, Wien. Ent. Mon., vii., p. 407, t. 14, f. 12.

Sikkim interior; Möller.

[Described from Borneo, and occurs at Amboina, *fide* Lederer.—H. J. E.]

176. *Nosophora* (?) *semivialis.**

Patania semivialis, Moore, Descr. Indian Lep., p. 209, pl. 7, f. 6; S. & C., No. 4300.

Two females. The species seems to me to belong to *Nosophora*, but I do not know the male, which is wanted to ascertain the true generic position.

Sikkim; Möller.

Genus Analtes, *Led.*, Wien. Ent. Mon., vii., p. 407.

177. *Analtes semitritalis*

Analtes semitritalis, Lederer, Wien. Ent. Mon., vii., p. 407, tab. 14, f. 14.

Sikkim; Möller.

[The type is from Amboina. Seems very rare in Sikkim.—H. J. E.]

178. *Analtes idyalis.*

Botys idyalis, Walker, Cat., 19, p. 996.
Analtes idyalis, Moore, Lep. of Ceylon, p. 319, pl. 183, f. 5; S. & C., No. 4116.

Sikkim; Möller.

[Moore's figure of this species is not good, the outer spots of the fore wing in all my specimens being much more distinct, and the hinder margin unicolorous. It occurs at about 4000 ft., but seems rare.—H. J. E.]

[* I cannot see from Moore's figure and description how to distinguish this from *Botys concatenalis*, Walk., Cat., xxxiv., p. 1408, the type of which was from Darjeeling.—H. J. E.]

Genus Hedylepta, *Led.*, Wien. Ent. Mon., vii., p. 407.

179. *Hedylepta vulgalis.*

Asopia vulgalis, Guenée, Delt. et Pyr., p. 202, pl. 6, f. 8.
Hedylepta vulgalis, S. & C., No. 4349.

Sikkim; Möller.

180. *Hedylepta tristrialis.*

Botys tristrialis, Bremer, Lep. Ost.-Sibir., p. 68, pl. 6, f. 7.

Tristrialis is neither a *Botys* nor a *Coptobasis*, in which genus it is placed in Staudinger and Wocke's Catalogue. Its characters agree very well with *Hedylepta*, still better than with *Omiodes*, the black anal tuft of the male being alone aberrant.

Darjeeling, 20th June, 1886; H. J. Elwes. Sikkim interior; Möller.

[My specimens are paler than Bremer's figure.—H. J. E.]

Genus Omiodes, *Guen.*, Delt. et Pyr., p. 355; Led., p. 409.

181. *Omiodes analis.*

Omiodes analis, Snellen, Tyds., 23, p. 227; 27, p. 37.
Charema albociliata, Moore, Descr. Indian Lep., p. 219; S. & C., No. 4232.

Sikkim; Möller.

182. *Omiodes noctescens.*

Charema noctescens, Moore, Descr. Indian Lep., p. 218; S. & C., No. 4235.

The characters of the genus *Charema*, Moore, do not differ from those of *Omiodes*, Guenée. I must note here that in *Omiodes* the maxillary palpi are not absent; they are very distinct in some of the species. *Noctescens* has recurved labial palpi, just as those of *Omiodes humeralis*, Guenée, and they are also bicolorous, only the inferior part is not whitish, but decidedly ochreous.

Sikkim; Möller. Mongpo, 4000 ft.; Gammie.

183. *Omiodes palliventralis*, nov. spec.

Three males of 30—32 mm. expanse.

This species, also a true *Omiodes*, is allied to *noctescens*, Moore, and still more to *humeralis*, Guenée; the shape of the wings and the length of the abdomen is the same as in these species, only the hind wings are shorter at the anal angle, and the patagia also shorter, not only than in *humeralis*, where they reach to the anal angle of hind wings, but also than in *noctescens*, where they attain two-thirds of these wings. In *palliventralis* they do not reach beyond the middle of the said margin. Besides, the legs are only ochreous white, not deep ochreous, as in *noctescens*, and the under side of the body also. From both species *palliventralis* is distinct by the paler yellowish costa of the central area of fore wings. Labial palpi recurved, bicolorous, white and fuscous, as in *humeralis*. Antennæ setaceous, deep fuscous, as the thorax, the upper side of the abdomen (with the anal tuft), and the wings. The ochreous part of the costa of fore wings is not distinctly limited, extending in one specimen to the apex, and it is suffused with fuscous scales; markings black, the lines thick, suffused; the first oblique, the second sinuate, as in the allied species; discal spots of same size as in *noctescens*. Hind wings with a very indistinct discal line; fringes fuscous, but in cells 1*b* and 2 of fore wings white with ochreous base, white-tipped in cell 1*d* and 2 of hind wings. Under side of wings paler, greyer, with traces of a discal line; sides of the venter fuscous grey; all tarsi and outside of fore tibiæ white, the remainder of the legs more greyish.

Sikkim; Möller.

Genus Omphisa, *Moore*, Lep. Ceyl., p. 318.

184. *Omphisa anastomosalis*.

Pionea? anastomosalis, Guenée, Delt. et Pyr., p. 373.
Botys illisalis, Walker, Cat., 18, p. 653; Lederer, Wien. Ent. Mon., vii., p. 371, pl. 9, f. 12.
Omphisa illisalis, Moore, Lep. of Ceylon, p. 318, pl. 183, f. 4; S. & C., No. 4107.

Very rightly separated from *Botys* by Mr. Moore.

Sikkim; Möller.

[Guenée's types, in very bad condition, were from Java, Walker's from Ceylon and North India. The species seems pretty common at low elevation, but I have never taken it myself.—H. J. E.]

185. *Omphisa repetitalis*, nov. spec. (Pl. XIX., figs. 6, 6 *a*).

Four specimens of 38—40 mm. expanse.

This species has all the characters of the genus *Omphisa*, Moore, 'Lepidoptera of Ceylon,' part 12, p. 317; in fact, it displays them even more decidedly than the hitherto solitary typical species, for the acute apex of the fore wings is more produced, and the hind margin of the fore and hind wings much more distinctly bent on vein 4, especially that of the latter. In other respects it is also very alike to *anastomosalis*, Guen. (*Pionea*), Delt. et Pyr., p. 373, *illisalis*, Walker, Lederer, Beitrag, pl. 9, fig. 12, and Moore, *l.c.*, p. 318, pl. 183, fig. 4; colour and markings similar: the principal differences consist in the hind margin of the wings not being denticulated, the ciliæ being only streaked with dark brown on the veins 3 and 4 of both wings, not generally, and the hind margin of posterior wings being blackish from the apex till vein 5, gradually narrowing downwards, and with a graphitic lustre in the middle. Lederer placed *anastomosalis* in *Botys*, but its generic separation by Mr. Moore is quite justified, and the proper place of *Omphisa*, Moore, in Lederer's System, is between Gen. 115, *Megastes*, Guen., Led., and 116, *Megaphysa*, Guen., Led. Labial palpi formed as in *anastomosalis*, a little stouter, pale yellow, outwardly brown; maxillary palpi very distinct. Antennæ distinctly ciliated, somewhat serrated (they are setaceous in *anastomosalis*). Thorax sordid ochreous brown; abdomen too, but clearer, and with distinct pale ochreous yellow spots on basal half. Ground colour of upper side of wings a pale whitish ochreous yellow, as in the allied species, in the same way mixed with luteous brown on the fore wings; only the costa, except on the basal and apical fourths, which are deep brown, and the hind margin posterior to a double denticulated second transverse line from veins 3—8 are pale; first transverse or antemedial line strongly curved, single, dark brown, on the outside of the upper part with a nearly black shade, which becomes wider downwards, and almost covers a small, hyaline, orbicular mark; reniform mark oblique, quadrate, elongate, also hyaline, brown-bordered; below it one smaller hyaline spot at the base of cell 2; the inferior part of a deep brown discal line is visible below the spot; second transverse line described above, its inferior part indistinct, lost in the brown suffusion, which, below vein 4, extends fully to the hind margin; vein 7 is dark brown, a thick marginal line also, the ciliæ pale yellow, except at the apex and anal angle, where they are dark brown; two transversal brown streaks are also found at the extremities of veins 3 and 4. Hind

wings paler and more hyaline yellow, their base suffused with black, the upper part of an ante-medial discal band luteous brown, dark-bordered, its inferior half blackish, basally ill-defined, a post-medial transverse line denticulated, double, black, basally shaded with blackish; it does not reach till the anal angle, but disappears below vein 2 in a fuscous cloud covering the anal fourth; upper part of hind margin adorned by the above-described blackish, or rather dark glossy grey, black-margined band; inferior part from vein 4 till anal angle with a thick marginal black line; ciliæ pale yellow; a thick basal line, interrupted from vein 3—1 *c*, and two transverse streaks on veins 3 and 4 are dark brown. Under side yellowish white; the apices of all wings, a discal mark on fore wing, and traces of a transverse line, which only becomes distinct towards the inner margin of hind wings, are dark brown.

Sikkim; Möller.

[Seems as abundant as the last, but not easy to distinguish without close examination.—H. J. E.]

Genus Terastia, *Guen.*, p. 211; Led., p. 415.

186. *Terastia proceralis.**

Terastia proceralis, Lederer, Wien. Ent. Mon., vii., p. 415 and p. 480 (1863); S. & C., No. 4284.

Very large specimens.

Darjeeling, July; H. J. Elwes. Sikkim; Möller. Upper Assam and Naga Hills; Doherty.

[Not common at light, and occurs at from 4 to 7000 ft. —H. J. E.]

Genus Agathodes, *Guen.*, p. 207 (*Stenurges*, Led., p. 416).

187. *Agathodes ostensalis.*

Perinephele ostensalis, Geyer, in Hübner's Zuträge, 5tes Hundert, p. 11, f. 833, 834.

Agathodes ostensalis, Guenée, Delt. et Pyr., p. 208; Moore, Lep. of Ceylon, p. 555, pl. 215, f. 10; S. & C., No. 4282.

Large specimens. I have one before me of 37 mm.

[* This seems to be identical with *Megaphysa egialalis*, Walk., Cat., xvii., p. 383 (1859), from India, and with *Agathodes diversalis* Walk., *l. c.*, xxxiv., p. 1307 (1865), from Darjeeling. If it is so, Walker's name has priority.—H. J. E.]

expanse. Geyer's figure (which is bad, as Guenée observes), measures only 30 mm., and my specimens from Java are, as a rule, not larger.

Lederer's alteration of Guenée's name is not admissible, because *Achatodes* and *Agathodes* are sufficiently different.

Tendong, Sikkim, 8000 ft., 1st August, 1886; H. J. Elwes. Sikkim; Möller. Khasia Hills, 4500 ft., 24th September, 1886; H. J. Elwes.

[Not uncommon at light in Sikkim.—H. J. E.]

Genus Diasemia, *Guen.*, p. 233; Led., p. 418.

188. *Diasemia litterata.*

Phalæna litterata, Scopoli, Entom. Carn., p. 229, No. 574.

Pyralis literalis, Hübner, Samml. Eur. Schmett, Pyr., f. 86.

Sikkim interior; Möller.

Genus Siriocauta, *Led.*, Wien. Ent. Mon., vii., p. 424.

189. *Siriocauta testulalis.*

Crochiphora testulalis, Geyer, in Hübner's Zuträge, 4 tes Hundert, p. 12, f. 629, 630.

Manica testulalis, S. & C. No. 4229.

Hydrocampa aquatilis, Boisduval, in Guérin, Icon. du Règne animal, Insect., pl. 90, f. 9.

Siriocauta testulalis, Led., Wien. Ent. Mon., vii., p. 424.

In Geyer's figure the antennæ are too short.

Sikkim; Möller.

[Occurs in South America, the Cape, and Amboina. Seems common in Sikkim.—H. J. E.]

190. *Siriocauta simialalis.*

Siriocauta simialalis, Snellen, Lepidopt. in Reise in Midden-Sumatra, p. 73; id., Tyds. v. Ent., 27, p. 39, pl. 3, f. 9, 9 *a*, 9 *b*.

Sikkim; Möller.

[Seems very near the last species.—H. J. E.]

Genus Bradina, *Led.*, Wien. Ent. Mon., vii., p. 424.

191. *Bradina ? pionealis*, nov. spec.

A fine and fresh female of 25 mm. expanse.

This species will probably form a new genus; the base of vein 11 of fore wings is recurved, and the veins 8—10 stalked; but as I do not know the male, which may be endowed with still other characters, I prefer to incorporate *pionealis* provisionally in *Bradina*, which, with it, seems to have affinities, though the palpi are rostriform and pointed. In general appearance the species reminds one of the genus *Pionea*, and also of my *Odontia* (better, *Orobena*, Sect. B) *exoticalis*, Tyds. v. Ent., 18, p. 191, pl. 11, f. 3, from Columbia, being smaller, the fore wings more elongated, their hind margin more oblique, the inner without tooth. Front a little obtusely prominent, ochreous brown, white-edged. Palpi twice as long as the head, porrect, pointed, the basal half white, the second ochreous brown. Antennæ setaceous. Thorax, fore wings, and fringes sordid straw-yellow, with a faint olivaceous tinge; the wings smooth, a little shining; they are unicolorous, with a black spot at one-fourth of cell 1*b*, and a second further on at three-fifths, which is crossed by an indistinct, slender, denticulated line originating from a short, oblique, black streak at two-thirds of the costa, and ending in a black spot at three-fifths of inner margin; on the disco-cellular there is another black dot, minute but distinct, others on the marginal line. Hind wings yellowish white, shining, unmarked. Abdomen whitish. At the under side the fore wings are marked as above, grey, the outer third behind the transverse line, from vein 7 to inner margin, pale yellow. Hind wings as on upper side. Legs yellowish.

Sikkim; H. J. Elwes.

[A single specimen only of this species, for which, having lost its label, I can give no exact locality.—H. J. E.]

Genus Pleonectusa, *Led.*, Wien. Ent. Mon., vii., p. 426.

192. *Pleonectusa admixtalis.*

Botys admixtalis, Walker, Cat., 18, p. 665.
Pleonectusa admixtalis, Moore, Lep. of Ceylon, p. 286, pl. 180, f. 13; S & C., No. 4110.
P. sodalis, Lederer, Wien. Ent. Mon., vii., p. 426 and p. 481.
Tabidalis, Led., is not the same as *admixtalis*, Walker

(*sodalis*, Lederer); perfect specimens of both are quite distinct, but I suppose that Lederer's were faded, and so his descriptions are not striking. The same remark is applicable to Mr. Moore's figures.

Sikkim; H. J. Elwes.

[*Tabidalis* occurs at Amboina and Perak; *admixtalis* is described from Ceylon.—H. J. E.]

Genus Stegothyris, *Led.*, Wien. Ent. Mon., vii., p. 427.

193. *Stegothyris diagonalis.*

Salbia diagonalis, Guenée, Delt. et Pyr., p. 201, No. 147; S. & C., No. 4301.

Stegothyris transversalis, Lederer, Wien. Ent. Mon., vii., p. 427 and p. 482, pl. 16, f. 5.

Botys plagalis, Moore, P. Z. S., 1867, p. 96.

Mongpo, 2500 ft., 3rd June, 1886; H. J. Elwes.

[The type was from Java.* Lederer gives Venezuela as the locality for his species.—H. J. E.]

Genus Orphnophanes, *Led.*, Wien. Ent. Mon., vii., p. 428.

194. *Orphnophanes productalis.*

Orphnophanes productalis, Lederer, Wien. Ent. Mon., vii., p. 428, pl. 16, f. 7.

Sikkim; Möller.

[Two imperfect specimens only. The type was from Amboina.—H. J. E.]

Genus Coptobasis, *Led.*, Wien. Ent. Mon., vii., p. 429.

195. *Coptobasis sulcialis.*

Botys sulcialis, Walker, Cat., 18, p. 684.

A true *Coptobasis*, Lederer.

Sikkim; Möller.

[The type was from Borneo, and Lederer records it from Amboina.—H. J. E.]

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* I have many specimens from Sumatra and Java, but never received it from America (Snellen).

196. *Coptobasis lunalis.*

Botys lunalis, Guenée, Delt. et Pyr., p. 352, No. 417.
Coptobasis lunalis, S. & C., No. 4271.
Botys thyasalis, Walker, Cat., 18, p. 734.

This species is a *Coptobasis*.

Darjeeling, 4th August, 1886; H. J. Elwes.

[The type was from Coromandel.—H. J. E.]

197. *Coptobasis textalis.*

Coptobasis textalis, Lederer, Wien. Ent. Mon., vii., p. 482, No. 117, pl. 16, f. 9.

A male.

The specimen is a dark one, and the second line of fore wings much less distinct than in Lederer's figure. I have, however, a male from Sumatra which forms the transition.

Darjeeling; Lidderdale.

[It is in the British Museum from Borneo.—H. J. E.]

198. *Coptobasis luctuosalis.*

Hyalitis luctuosalis, Guenée, Delt. et Pyr., p. 290.
Ebulea Zelleri, Bremer, Lepid. Ost.-Sibirien's, p. 70, pl. 6, f. 12 (rough).
Coptobasis erebina, Butler, Illustr., ii., p. 57, pl. 59, f. 1.

Luctuosalis, Guenée, is the oldest name for this species (see Oberthür, Ann. Soc. Ent. de France, 1885, Bull., p. lvii), but Guenée's description is not very striking. Mr. Butler rightly placed his *erebina* in the genus *Coptobasis*. I have not seen the species, but Mr. Elwes writes to me, "I have specimens from Sikkim agreeing with the species of Amoorland and Japan."

199. *Coptobasis deficiens.*

Coptobasis deficiens, Moore, Lep. of Ceylon, p. 556, pl. 215, f. 12; S. & C., No. 4269.

The palpi in this species are very long; still I believe that it may very well be considered as a *Coptobasis*. It belongs to Lederer's Section A of the genus.

Darjeeling, 20th July, 1886; H. J. Elwes.

200. *Coptobasis denticulata.*

Pramadea denticulata, Moore, Descr. Indian Lep., p. 211; S. & C., No. 4438.

This species is a true *Coptobasis*, Lederer, and belongs to Section A of the genus.

Mongpo, 4000 ft.; H. J. Elwes. Sikkim interior; Möller.

201. *Coptobasis? æmealis.*

Botys æmealis, Walker, Cat., 18, p. 671.

A female. I expect that the male will prove that this species is a *Coptobasis*, and therefore mention it here. The colour of the upper side agrees with that of the bulk of the species of the genus, but the apex of fore wings is rather obtuse, and they have, at the origin of the second line, very near to the costa, a distinct yellowish white reniform or bean-shaped mark; the hind wings have a whitish discal line, the central part of which is effaced. First line and discal streak of fore wings dark.

Sikkim, 7000 ft.;

[Agrees with the type from Ningpo.—H. J. E.]

Genus Diplotyla, *Meyrick*, Trans. Ent. Soc. Lond., 1886, p. 246.

202. *Diplotyla exuvialis*, nov. spec.

A male of 25 mm. expanse.

Shape of wings the same as in my *Ædiodes? orientalis*, Tyds. v. Ent., 23, p. 233, and 27, pl. 4, f. 3, 3 *a*, 3 *b*, which is much better placed in Mr. Meyrick's new genus *Diplotyla*. The body, however, is more slender, the abdomen longer, and the antennæ have only one tooth-like projection at two-thirds. Antennæ whitish, distinctly ciliated. Palpi rather narrow, recurved, their terminal joint distinct, truncated; they are bicolorous, whitish and fuscous, as the front; vertex obscure ochreous. Upper side of body and wings dark fuscous; the fore wings have at two-thirds towards the costa an indistinct ochreous spot, but are otherwise unmarked, as well as the hind wings. Fringes cinereous brown, whitish in cell 1 *b* of fore wing and 1 *d* and 2 of hind wings. Abdomen twice as long as the inner margin of hind wings. Under side paler, more greyish, the body and legs whitish. Veins 8—10 of fore wings are stalked, and the maxillary palpi present, though very short.

Sikkim; H. J. Elwes.

Genus Syngamia, *Guen.*, p. 187 ; Led., p. 434.

203. *Syngamia floridalis.*

Botys floridalis, Zeller, Micropt. Caff., p. 60.
Æthaloëssa floridalis, Lederer, Wien. Ent. Mon., vii., p. 435, pl. 17, f. 2.
Botys Witialis, Felder & Rogenh., Nov., ii., 2, pl. 135, f. 8.
Syngamia floridalis, Meyrick, Trans. Ent. Soc. Lond., 1886, p. 239.

I agree with Mr. Meyrick that the genus *Æthaloëssa*, Lederer, may be united to *Syngamia*, Guenée, Lederer.

Darjeeling, 20th June and 4th August, 1886 ; H. J. Elwes. Tendong, 1st August ; id. Sikkim ; Möller.

[This very wide-ranging species was not uncommon at light.—H. J. E.]

Genus Gonocausta, *Led.*, Wien. Ent. Mon., vii., p. 436.

204. *Gonocausta? vestigialis*, nov. spec.

Three males of 25—26 mm. expanse.

In this species the shape of fore wings is as in *Gonocausta zephyralis*, Lederer, Wien. Ent. Mon., vii., p. 436, pl. 17, f. 5,* but the hind wings are more like those of *Ætholix flavibasalis*, Guen., male (the female of that species has shorter rounded hind wings) ; the palpi, however, are porrect, like those of *zephyralis*, and not recurved. Strictly, a new genus should be formed, but as I have only males of the new species, and thus am not able to give the characters in full, I prefer to place *vestigialis* provisionally in *Gonocausta*. Labial palpi porrect, rostriform, bicolorous, white and ochreous brown; maxillary palpi filiform. Ocelli present. Forehead rounded. Antennæ two-thirds of fore wings, setaceous, distinctly ciliated ; apex of fore wings rather acute, slightly recurved ; hind margin as in *zephyralis*, Led. Hind wings nearly triangular, the apex and anal angle distinct but obtuse, the hind margin nearly straight, with two shallow undulations. Colour of body and wings ochreous, the former and the base of wings darker, the hind margin of fore wings and the apex of hind wings pale fuscous ; the remainder paler, shining, thinly clothed. Fore wings

* I have a specimen of *zephyralis* from Columbia, but never received it from India. It is also not enumerated among the Indian *Pyralidina* in Colonel Swinhoe's 'Catalogue of the Moths of India,' and so the habitat given by Lederer may be considered at least to be doubtful.

with a curved ferruginous first transverse line at one-fourth; inner margin of hind wings with a ferruginous patch, surmounted with a tuft of woolly ochreous hairs on the base of vein 2; second line near hind margin, black, beginning with a strong oblique streak at costa of fore wings, then interrupted, continued on hind wings as a series of black spots; marginal line brown, more distinct on hind wings; fringes brown, paler on hind wings, and with a white spot in cell 6 of fore wings; no distinct discal spots. Under side paler, shining; markings as above; no tuft on hind wings. Legs yellowish, the tarsi white, the anterior with black apex, the middle and hind tarsi with black annulations. Nervulation of fore wings as in *Botys;* veins 4 and 5 of hind wings stalked.

Sikkim; Möller.

205. *Gonocausta? ferruginata.*

Agrotera ferruginata, Moore, Descr. Indian Lep., Atk., p. 209.

A male.

This species is congeneric with *vestigialis,* but certainly not an *Agrotera,* the labial palpi being quite different from those of that genus, rostriform, obtuse, their third joint very short, the maxillary palpi distinct, filiform.

Ferruginata differs from *vestigialis* by its smaller size, the regularly arched upper part of the second line of fore wings; the discal line of hind wings is also not dissolved in a series of points, but nearly uninterrupted, undulated.

Sikkim; Atkinson.

Genus Zinckenia, *Zell.*, Caff., p. 55; Led., p. 436.

206. *Zinckenia recurvalis.*

Pyralis recurvalis, Fabricius, Ent. Syst., iii., 2, p. 237, No. 407.

Zinckenia recurvalis, Zeller, Micropt. Caffr., p. 55 (1852).

Spoladea recurvalis, Guenée, Delt. et Pyr., p. 225, pl. 8, f. 5 (1854).

Hymenia recurvalis, S. & C., No. 4262.

Guenée was probably unacquainted with Zeller's previous and excellent description of the genus *Zinckenia,* otherwise he would not have formed a new name. That

of Hübner's 'Verzeichniss,' *Hymenia*, can never take precedence of Zeller's, as it is without description.

Darjeeling, 4th August, 1886; H. J. Elwes. Sikkim; Möller.

[One of the most abundant species at light in Darjeeling.—H. J. E.]

Genus Agrotera, *Schrank*, Faun. Boica, p. 163; Led., p. 439.

207. *Agrotera scissalis.*

Ædiodes scissalis, Walker, Cat., 34, p. 1526.

Sikkim; Möller. Naga Hills; Doherty.

[A single bad specimen only in Möller's collection. The type was from Java.—H. J. E.]

Genus Diathrausta, *Lederer*, Wien. Ent. Mon., vii., p. 438.

208. *Diathrausta profundalis.*

Diathrausta profundalis, Led., *l. c.*, pl. 17, f. 4.

Sikkim; Atkinson.

Genus Cirrhochrista, *Led.*, Wien. Ent. Mon., vii., p. 440.

209. *Cirrhochrista fumipalpis.*

Cirrhochrista fumipalpis, Feld. & Rogenh., Novara, ii., 2, pl. 135, f. 31; Pagenstecher, Jahrb. des Nassanisch. Vereins, vol. 37 (1884), p. 135 (description).

Sikkim; Möller.

[A single specimen only of this peculiar-looking species, which must be rare in Sikkim. The type was from the Molucca Islands. I have another specimen from the Naga Hills.—H. J. E.]

Genus Pycnarmon, *Led.*, Wien. Ent. Mon., vii., p. 441.

210. *Pycnarmon jaguaralis.*

Spilomela jaguaralis, Guenée, Delt. et Pyr., p. 283 (♀).
Pycnarmon jaguaralis, Lederer, Wien. Ent. Mon., vii., p. 441, pl. 17. f. 11 (♂); S. & C., No. 4316.

The maxillary palpi are not absent, as Lederer says; they are, however, small and easily overlooked.

Sikkim, 2000 ft.; H. J. Elwes. Mongpo, 4000 ft.; id. Sikkim; Möller.

211. *Pycnarmon abraxalis.*

Zebronia abraxalis, Walker, Cat., 34, p. 1349.
Pycnarmon abraxalis, S. & C., No. 4313.

Darjeeling, July; H. J. Elwes. Sikkim; Möller. Naga Hills; Doherty.

[A common species in Sikkim, somewhat variable in its markings.—H. J. E.]

Genus Spilomela, *Guen.*, p. 280.

212. *Spilomela ommatalis.*

Spilomela ommatalis, Snellen, Tyds. v. Ent., 23, p. 235; id., 27, p. 44, pl. 4, f. 5, 5*a*.

The figure in the 'Tydschrift' is not elaborate, but sufficient for recognising the species.

Sikkim; Möller. Mongpo, 4000 ft.; Gammie.

[Seems a common species.—H. J. E.]

Genus Zebronia, *Hübn.*, Verz., p. 361.

213. *Zebronia zebralis.*

Pycnarmon zebralis, Moore, P. Z. S., 1867, p. 91, pl. 7, f. 12; S. & C., No. 4318.

This species is no *Pycnarmon*, as the antennæ of the male are simple; but it is more nearly allied to *striginalis*, *platinalis*, and *ovulalis*, Guenée, which I have separated from *Conchylodes*, Lederer, as a distinct genus (*Ledereria*, Snellen, Tyds., 18, p. 256). However, as that name is preoccupied (see Tyds., 23, p. 236), I propose for it the name *Zebronia*, derived from the well-known name-store, Hübner's 'Verzeichniss.'

Sikkim; Möller.

214. *Zebronia rigidalis*, nov. spec.

Two females of 25 mm. expanse.

Labial palpi recurved, narrow, compressed, their terminal joint short, pointed; they are white, the first article marked with a

black spot; base of antennæ spotted with black. Head and thorax white, the latter with longitudinal black lines. Upper side of wings white, not very pure, a little yellowish, especially on the hind pair, which besides has a deep ochreous patch at anal angle; basal third of fore wings marked with three straight, vertical, broad black stripes, the centre with a black streak along costa, just in the middle, an elongated black discal spot, and a somewhat obliquely placed furcate black stripe; parallel to hind margin, more curved than this, we observe a fifth black stripe, which is attenuated towards the costa; hind margin black, also on hind wings; these are marked with five converging black stripes, which stop at the limit of the ochreous anal patch, except the second from the base, which crosses it and attains the inner margin. Fringes white, with two black lines. Basal half of abdomen white, with two lateral black stripes, the second half ochreous, with white marginal segments, their last marked with a black spot, and a black apex. Under side white, the markings of the upper side sketched with pale grey. Front legs with four black spots.

Sikkim; Möller.

215. *Zebronia tibialis.*

Synclera tibialis, Moore, Descr. Indian Lep., p. 216; S. & C., No. 4307.

Sikkim; Möller.

[A single specimen only.—H. J. E.]

216. *Zebronia auroralis.*

Haritala auroralis, Moore, Descr. Indian Lep., p. 215, pl. vii., f. 17; S. & C., No. 4319.

Sikkim interior; Möller.

[A single bad specimen only. The type was from Cherra Punji. According to Mr. Warren's arrangement this is rather a *Pagyda*.—H. J. E.]

217. *Zebronia? bistrigalis.*

Zebronia bistrigalis, Walker, Cat., 34, p. 1348.
Pycnarmon bistrigalis, S. & C., No. 4314.

A male.

This species is provided with a tolerably large flat tuft of hairs and long scales at the under side of hind wings, on the costa, near to the base. It also bears only a

superficial resemblance to the Indian as well as to the American species, the abdomen being shorter, the wings broader, and the antennæ not so long; so it might deserve the formation of a new genus between *Zebronia* and *Conchylodes*.

Sikkim; Möller.

[This is the type of genus *Metaxyspila*, Warren MSS. —H. J. E.]

Genus Ravanoa, *Moore*, Lep. Ceyl., iii., p. 284.

218. *Ravanoa virgatalis*.

Pycnarmon virgatalis, Moore, P. Z. S., 1867, pl. 92, f. 7—10; S. & C., No. 4317.

This species has, in the male sex, simple antennæ, and is much more slenderly built than *Pycnarmon jaguaralis*, Guenée. In fact, it agrees, in facies and generic characters, with *Ravanoa bilineolalis*, Moore. *Ravanoa creonalis*, Moore, belongs to Meyrick's genus *Dolichosticha*.

Sikkim; Möller.

[This belongs to genus *Eutrichotis*, Warren MSS.— H. J. E.]

Genus Conchylodes, *Guen.*, *Lederer*, p. 442 (pars.).

Perhaps it would be better to unite *caberalis* and the allied species under the generic name *Aripana*, Moore, Lep. of Ceylon, p. 312, to reserve the name *Conchylodes*, Guen., for *diphtheralis* and *hebræalis*, and to place *striginalis*, *platinalis*, *argentalis*, and *ovulalis* in a third genus *Zebronia*, Hübn.; but as I do not possess *diphtheralis* and *hebræalis*, I prefer to leave the question undecided. Lederer speaks of two sections (A and B) of his genus *Conchylodes*, but does not indicate the species belonging to them.

219. *Conchylodes paucipunctalis*, nov. spec. Pl. XIX., fig. 2).

A male of 20 mm. expanse.

I cannot consider this species, of which I have also four Javanese specimens of 20—21 mm. expanse, as a variety of *caberalis*, Guen., to which species it is allied, because, as in *diaphana*, Cram., *meritalis*, Walker (*baptalis*, Snellen), and judging after the figure, also in *levinia*, Cram., the costa of fore wings is not marked with black striæ, as in *caberalis*, Guen., *crinalis*, Walk., Led., and

corycialis, Snell. As to *argyria*, Butler (*Zebronia argyria*, Illust., 3, p. 76, pl. 59, f. 9), it seems to be distinguished by the absence of transverse lines on fore wings and by their grey costa (though this latter character is not mentioned in the description). Mr. Butler describes and figures also *four* black spots on hind wings. *Paucipunctalis* differs from the African *diaphana* by the want of the apical black spots of fore and hind wings, by the position of the outermost of the four basal spots of fore wings, which is not placed on the same line as the first and second but lower, by the flexuous, not angular, second line, and by the smaller size. From *meritalis* it differs by its larger size, the want of the black stripe on hind margin of fore wings, and the want of the apical spot of hind wings. *Levinia* is a roughly figured small American species, which I do not possess, and leave undiscussed. Palpi white, like the thorax and abdomen, the latter with two black spots near the base, and a faint ochreous band with two minute black spots near the apex. Upper side of wings white, with two diffused ochreous transverse lines, the second flexuous; four black spots at base, as shown by the figure, one on the disco-cellular, a sixth on the costa above the fifth, a little more outward, a seventh at the origin of the second line, and the eighth in cell 2, near hind margin; the sixth and seventh affect in two specimens the form of black rings, in the other three they are very small. As in *meritalis*, the black spot on inner margin, at the extremity of the second line, is wanting. Hind wings only with *three* black spots; hind margin ochreous, but only in the Sikkim specimens distinctly so, in two of the Javanese nearly white. Fringes greyish white. Under side suffused with grey, especially along the costa and hind margin of fore wings.

Sikkim; Möller.

220. *Conchylodes corycialis.*

Conchylodes corycialis, Snellen, Tyds. v. Ent., 23, p. 238; id., 27, p. 44. pl. 4, f. 6.

Sikkim; Möller.

[A single specimen only. The type from Celebes.—H. J. E.]

221. *Conchylodes meritalis.*

Zebronia? meritalis, Walker, Cat., 17, p. 479.

Aripana meritalis, Moore, Lep. of Ceylon, p. 313; S. & C., No. 4312.

Conchylodes baptalis, Snellen, Tyds. v. Ent., 23, p. 237; id., 27, p. 44, pl. 4, f. 7.

In the figure in the 'Tydschrift' the apex of fore wings is too sharp, but otherwise it is tolerably accurate. The fourth basal spot (on inner margin) is, indeed, sometimes absent.

Sikkim interior; Möller.

[A single bad specimen only. The type was from Ceylon.—H. J. E.]

222. *Conchylodes æriferalis.*

Conchylodes æriferalis, Moore, P. Z. S., 1877, p. 618.
Aripana æriferalis, S. & C., No. 4309.

Sikkim; Möller.

[Of this also there was only one bad specimen in Möller's collection. The type was from the Andaman Islands.—H. J. E.]

223. *Conchylodes ? marginalis*, nov. spec.

A female of 20 mm. expanse.

This species very much resembles, by its pure white, black, marked wings, the genus *Conchylodes*, Lederer (sens. strict.); the form of the labial palpi and the neuration are also the same, but I do not know the male, which may perhaps be endowed with special characters. Labial palpi white, narrow, recurved, appressed; third article long, pointed, erect. I cannot distinctly perceive maxillary palpi; perhaps they are short and filiform. Head rounded, white, as the antennæ, the body, and the wings; apex of abdomen black, also the sharply limited conspicuous hind margin of all wings and the markings; these consist in two rounded costal spots of fore wings, near to the base and at one-third, a discal spot and a flexuous second line, which is very slender on hind wings, almost extinguished on the inner half of fore wings, and gradually incrassating towards the anterior margin on their costal half. First line of fore wings very indistinct and slender; discal spot of hind wings small, elongate. Fringes pale grey, with a dark basal line. Markings of under side as above, but only sketched. Legs white, the anterior pair with black spots.

Sikkim; Möller.

[A near ally of this species is in the British Museum Collection from New Guinea.—H. J. E.]

Genus Synclera, *Led.*, Wien. Ent. Mon., vii., p. 444.

224. *Synclera traducalis.*

Eudioptis traducalis, Zeller, Micropt. Caffr., p. 54.
Spilomela retinalis, Lederer, Wien. Ent. Mon., i., p. 101.

Sikkim; Möller.

[Seems very common at low elevations, but I have not taken it myself.—H. J. E.]

225. *Synclera subtessulalis.*

Botys subtessulalis, Walker, Cat., 34, p. 1406.
? Synclera traducalis, Moore, Lep. of Ceylon, p. 316, pl. 182, f. 9.

Sikkim; Möller.

[This wide-ranging species seems less common than the last in Sikkim.—H. J. E.]

226. *Synclera onychinalis.*

Asopia onychinalis, Guenée, Delt. et Pyr., p. 205, pl. 6, f. 7.
Synclera onychinalis, Snellen, Tyds. v. Ent.. 27. p. 45.
Lepyrodes astomalis, Felder & Rogenh., Novara, ii., 2, pl. 135, f. 22.
Glyphodes astomalis, Meyrick, Trans. Ent. Soc. Lond., 1886, p. 224.

This species was omitted by Lederer, probably from inadvertence. Of course, it is no *Asopia*, and I believe the genus *Synclera* to be its proper place.

Sikkim interior; Möller.

[A single damaged specimen only.—H. J. E.]

Genus Lepyrodes, *Guen.*, p. 277; Led., p. 445.

227. *Lepyrodes geometricalis.*

Lepyrodes geometricalis, Guenée, Delt. et Pyr., p. 278, No. 271, pl. 8, f. 6.

Mongpo, 4000 ft.; H. J. Elwes. Sikkim; Möller.

Genus Phalangiodes, *Guen.*, p. 278.

228. *Phalangiodes neptis.**

Pyralis neptis, Cramer, Uitl. Kap., iii., p. 128, pl. 264, f.
Phalangiodes neptisalis, Guenée, Delt. et Pyr., p. 279.

Sikkim ; Möller.

229. *Phalangiodes rivulalis*, nov. spec. (Pl. XX., figs. 1, 1 *a*).

Two males of 31 and 29½ mm. and a female of 28 mm. expanse.

This species must be placed between *neptis*, Cramer, and *columalis*, Snellen (Tyds. v. Ent., 23 (1879), p. 239 ; 27 (1883—84), p. 46, pl. 4, f. 8, ♀). It has the same shape of wings and nervulation as *columalis*, and the white spots are also without well-defined dark margins ; but the ground colour of the upper side of the wings is still more uniform violet-grey, the basal *half* of hind wings is vitreous white, with a large oval dark central spot on the discocellular, and a sinuated hind margin. Besides, instead of the two elongated vitreous white spots along the somewhat paler hind margin of the wing, which we observe in *neptis* and *columalis*, there is a white line, the angulated upper half of which is separated by an interruption in cell 2 from the sinuated inferior part that ends in the anal angle. Fore wings marked as in *columalis*, but instead of the inferiorly dilatated vitreous white spot at one-third of the wing, we find two superposed elongate spots, and a point at the base of cell 2 ; second half of the wing marked with four vitreous white spots, as in *neptis* and *columalis ;* they are, however, widely separated, and the spot in the anal angle, which is somewhat lunular, as in *neptis*, is much narrower ; ciliæ grey. Under side of the wings marked as above, but the ground colour paler, especially on hind wings. Legs nearly white, the anterior tarsi with grey hair on the first and second joints.

Sikkim, the male of 31 mm. (O. Möller) ; Sumatra, Deli (Schagen van Leeuwen) ; Java, Batavia (Piepers).

[Seems commoner than the last in Sikkim, but I have never taken it myself.—H. J. E.]

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* *Phalangodes*, Lederer. This name is preoccupied since 1842 for a genus of *Arachnidæ* (Moore, Lep. of Ceylon, p. 310), but I believe that *Phalangiodes* is still disposable.

Genus Pterygisus, *Butler*, Trans. Ent. Soc. Lond., 1886, p. 429 (*Isopteryx*, Guenée, Lederer).

230. *Pterygisus fœdalis.*

Isopteryx fœdalis, Guenée, Delt. et Pyral., p. 228, pl. 4, f. 7.

I. tenellalis, ibid., p. 228.

Physematia epispila, Meyrick, Trans. Ent. Soc. Lond., 1886, p. 257.

A male.

As the name *Isopteryx* was pre-occupied, Mr. Butler changed it into *Pterygisus*.

Sikkim?;

Genus Hydrocampa, *Latreille*, Fam. Nat., p. 478; Led., p. 451.

231. *Hydrocampa exsolvalis.*

Hydrocampa exsolvalis, Snellen, Lepidoptera, in Reize in Midden-Sumatra, p. 76 (1880).

Cymoriza inextricata, Moore, Descr. Indian Lep., p. 210, pl. vii., f. 7 (♂); S. & C., No. 4390.

C. rivularis, Moore, Descr. Indian Lep., p. 210, pl. vii., f. 8 (♀); S. & C., No. 4395.

This species is no *Cymoriza;* it is true that the characters of *Hydrocampa*, Lederer, are also not strictly applicable to it, but as I have not yet had the opportunity to examine a male, I abstain from forming a new genus, which I suppose will be necessary.

Sikkim; Möller.

232. *Hydrocampa simplalis*, nov. spec.

A female of 19 mm. expanse.

This species belongs to Lederer's Section A of the genus Hinterflügelrippen normal); the markings, however, are less complicated, the first line of fore wings absent, the upper part of the second regularly arched, not sinuous or angulated. Antennæ, palpi, head, thorax and the ground colour, the wings white, not very pure, a little greyish. No first line nor discal spot; second line arched, the upper part from the costa to vein 3 distinct, nearly black, the inferior hardly visible. Hind wings with a black discal spot and a thin sinuated grey discal line. Hind margin narrowly

pale ochreous, as in the allied species, basally margined by a waved dark grey line, which is more distinct towards the apices of the wings. Behind the second line of the fore wings, the discal line of the hind wings and the hind margin, the ground is clouded with pale fuscous. Fringes pale grey.

Sikkim; Atkinson.

Genus Oligostigma, *Guen.*, p. 260.

233. *Oligostigma colonialis.*

Oligostigma colonialis, Guenée, Delt. et Pyr., p. 262, No. 248; Snellen, Tyds. v. Ent., 19, p. 189 and p. 198, pl. 8, f. 3, *a—d*; S. & C., No. 4407.

On the figure in the 'Tydschrift' the first unocellated spot on the margin of hind wings is not distinctly indicated.

Sikkim; Möller.

[I have never taken any species of *Oligostigma* myself in Sikkim, but Möller's collectors got them not uncommonly at low elevations.—H. J. E.]

234. *Oligostigma saturatalis*, nov. spec.

A female of 25 mm. expanse.

This genus comes next to *simplicialis*, Snell., and *latifascialis*, Snell. (Tyds. v. Ent., 19, pp. 189 and 201); it differs from the first by the very broad deep ochreous central fascia of hind wings, which is still broader than in *latifascialis*, leaving only a narrow streak of the lustrous white ground colour between it and the black bordered yellow margin; this margin is marked with three white black-margined spots, as in *simplicialis* (in *latifascialis* with two), and the trigonous central patch of fore wings is also shaped as in the first species; it is deep ochreous, with sinuous dark grey basal and hind borders, extending till the costa. All other markings are deep, dull, pure ochreous yellow, and consist, on fore wings, of three stripes along the costa and inner margin, while the third, narrower and curved, is found in cell 1*b*; these are all without darker margins. Two others are parallel to the hind margin, and of these the interior has only a slender black margin at the outside; the exterior has them on both sides, slender, distinct, and waved. Fringes dark grey, with a darker spot at the apex. On hind wings the central yellow fascia is diffused over the apical third, and the fringes are grey, with a darker basal line. Veins

8—11 of fore wings stalked; 6—7 from a point with 8; 3—5 from a point, also 4 and 5 of hind wings; disco-cellulars very oblique.

Sikkim; Möller.

235. *Oligostigma simplicialis.*

Oligostigma simplicialis, Snellen, Tyds. v. Ent., 19, p. 189 and p. 201, pl. 8, f. 6.

The figure in the 'Tydschrift' is not very exact; the tinge of the yellow markings on the apical part of the fore wings is too brownish, and the yellow discal fascia of hind wings should have been diffused just behind the three ocellated spots.

Sikkim interior; Möller.

236. *Oligostigma sejunctalis.*

Oligostigma sejunctalis, Snellen, Tyds. v. Ent., 19, p. 189 and p. 207, pl. 9, f. 11.

Sikkim; Möller.

237. *Oligostigma papulalis*, nov. spec.

A male. Length of a fore wing, 12 mm.

In this species the third article of labial palpi is distinct and club-like, while in all the other species of my section B of the genus it is short, truncate, or pointed. Basal article of antennæ with a peculiarly shaped, slender, clubbed projection; the discoidal cell of fore wings with a depression, covered on the upper side by a conspicuous flat crest of scales, inserted on the costa of the cell; margin of hind wings marked with four large minutely white-centred spots upon a wholly unbordered pale ochreous stripe. By these characters *papulalis* is very distinct. Ground colour of wings lustrous white, a little greyish; costa of fore wings suffused with luteous and grey, the crest of scales darker, shining; inner margin of wing pale ochreous; discal fascia wedge-shaped, rather narrow, luteous, grey-margined, oblique, pointed, converging in cell 1*b*, with a luteous yellow stripe descending from the costa, and which has at the outside a slender, distinct, grey margin; marginal band of wing pale bright ochreous yellow, black-margined; base of hind wings pale ochreous, grey-margined; central fascia broad, widening from the inner margin towards the apex, and distinctly grey-margined on both sides from inner margin till vein 6; black marginal spots somewhat 8-shaped, their upper part

white-centred. Fringes pale grey. Veins 8—11 of fore wings stalked; 7 from a point with 8; 3—5 from a point; 4 and 5 of hind wings short-stalked; disco-cellulars very oblique.

Sikkim; Möller.

Genus Cymoriza, *Guen.*, p. 271.*

238. *Cymoriza irrectalis.*

Cymoriza irrectalis, Guenée, Delt. et Pyr., p. 272, pl. 9, f. 4; S. & C., No. 4391.

One specimen represents a dark variety in which the upper side of the wings is almost entirely fuscous brown, with the white markings partly obliterated.

Darjeeling, 4th August, 1886; H. J. Elwes. Bhootan, Möller.

239. *Cymoriza marginalis.*

Cymoriza marginalis, Moore, Descr. Indian Lep., p. 211.

Bhootan; Möller. Sikkim; Coll. Atk.

Fam. CRAMBIDÆ, Zell.†

Genus Ramila, *Moore*, P. Z. S., 1867, p. 667.

240. *Ramila marginella.*

Ramila marginella, Moore, P. Z. S., 1867, p. 667, pl. 33, f. 16; S. & C., No. 4660.

Sikkim, 1—4000 ft.; Möller.

241. *Ramila acciusalis.*

Margaronia acciusalis, Walker, Cat., 19, p. 997.
Ramila acciusalis, Moore, Lep. of Ceylon, p. 389, pl. 184, f. 5.
Cirrhochrista acciusalis, id., Descr. Indian Lep., p. 227 (♀); S. & C., No. 4658.

This species was well placed in *Ramila*, but is no *Cirrhochrista*.

Sikkim; Möller.

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* Not identical with *Cymoriza*, Lederer (see Snellen, Tyds. v. Ent., 23, p. 243).

† Zeller, 'Chilonid. et Crambid. genera et species,' 1863.

[Moore's figure does not show the two bands across the wings at all.—H. J. E.]

Genus Brihaspa, *Moore*, P. Z. S., 1867, p. 666.

242. *Brihaspa atrostigmatella.*

Briaspa atrostigmatella, Moore, P. Z. S., 1867, p. 666, pl. 33, f. 13; Felder & Rogenh., Novara, ii., 2, pl. 98, f. 19; S. & C., No. 4657.

Sikkim; Möller. Darjeeling, August; H. J. Elwes.

Genus Scirpophaga, *Treitschke*, Schmett. von Europa, ix., i., p. 55; Zeller, Chil. et Cramb. gen. et spec., p. 1.

243. *Scirpophaga auriflua.*

Scirpophaga auriflua, Zeller, *l. c.*, p. 1; Moore, Lepid. of Ceylon, p. 387.

A male. A second specimen differs from the other by the presence of a black discal dot on fore wings; the under side of these wings is also not suffused with grey; the other characters are the same. Perhaps a distinct species, but as it is somewhat rubbed, and the palpi are in bad condition, I abstain from giving it a name.

Sikkim; Möller.

Genus Chilo, *Zincken*, *Zeller*, Chil. et Cramb. Gen. et Species, p. 6.

244. *Chilo ? ambiguellus*, nov. spec. (Pl. XX., fig. 4).

Two males of 37 and 43, two females of 42 and 53 mm. expanse.

Though this species has, in its general aspect, some resemblance with our European *Chilo phragmitellus*, and looks like a stout species of that genus, yet there exist many divergencies. Firstly, with regard to the nervulation, vein 8 of hind wings is free, vein 11 of fore wings oblique, vein 7 short-stalked with veins 8—10, vein 3 comes from a point with 4 and 5, not emerging between 2 and 4, as in *Chilo*, and the disco-cellular of hind wings is much less oblique. The rostriform palpi have only the length of the thorax, and the female abdomen is obtuse, with a short anal tuft, as in *Schœnobius gigantellus* ♀. The inner margin of the discoidal cell of hind wings is ciliated on the upper side. Possibly the right place of the species might be near *Cledeobia*. Antennæ hardly as

long as the half of the costa of fore wings, setaceous, thicker in the male. Labial palpi somewhat rough-haired, fuscous, the base pale; maxillary palpi pencil-like, distinct; front obtusely protruding. Ocelli distinct, tongue wanting. Head with antennæ an thorax fuscous, paler in the female. Wings shaped as in *Chilo phragmitellus*, pale ochreous brown in the male, still much paler in the female; a spot at the base, two transverse rows of spots at the place of the ordinary lines, a shade behind the second, and a large rounded spot on the disco-cellular, brown; the first row consists of two or three spots and is outwardly oblique, the second is much more so in the opposite direction, somewhat flexuous and more distinct; both are meeting in cell 1 *b*, and there confluent; shade behind the second line not reaching the apex; marginal spots black, distinct, larger in the male. Fringes paler than the wing, especially in the male. Hind wings white, in the male with a row of dark spots from the apex till vein 2. Abdomen fuscous. Under side of wings nearly white; four discal spots, a transverse row of spots on all wings at three-fourths, and marginal spots brown, but very obsolete in one of the females. Legs pale fuscous (♂) or whitish (♀), smooth, with long spurs as in *Chilo phragmitellus*.

Sikkim, Tonglo, 10,000 ft., July; id., 7000 ft.; H. J. Elwes.

Genus Diptychophora, *Zeller*, Stett. Ent. Zeit., 1866, p. 153.

245. *Diptychophora præmaturella.*

Eromene præmaturella, Meyr., Australian Microlepid., p. 198.

Diptychophora præmaturella, id., *l. c.*, p. 217.

Eromene dilatella, id., p. 199.

Sikkim interior; Möller.

Genus Eschata, *Walker*, Catal., ix., p. 133.

246. *Eschata argentata.*

Eschata argentata, Moore, Descr. Indian Lep., Atk. p. 227.

Sikkim; Atkinson. Naga Hills, 5—7000 ft., August, 1889; W. Doherty.

247. *Eschata conspurcata.*

Eschata conspurcata, Moore, Descr. Indian Lep., Atk., p. 227.

Sikkim; Möller.

[Genus Agastya, *Moore*, P. Z. S., 1881, p. 378.

248. *Agastya hyblæoides.*

Agastya hyblæoides, Moore, *l. c.*, p. 379.

A single specimen, which agrees with Mr. Moore's type. I cannot tell where this curious looking insect should be placed, as Mr. Snellen had not seen it.

Sikkim, June 17th, 1887; Dudgeon.

249. *Agastya flavomaculata*, Moore, *l. c.*

This appears to differ only in smaller size, and in having a small yellow spot between the median and submedian veins. The type from Darjeeling should be in the Atkinson collection, but I could not find it.—H. J. E.]

Genus Crambus, *Fabr.*, *Zeller*, Chil. et Cramb. Gen. et Spec., p. 14.

250. *Crambus latellus*, nov. spec.

A female, without abdomen, of 27 mm. expanse.

This species is very distinct by its broad white fore wings, sparingly marked with ochreous yellow along the hind margin, and with a black central dot, situated on the base of vein 2, a somewhat unusual place. Palpi as long as the thorax, bicolorous, the basal half ochreous, the central fourth white, the tip black. Head and thorax denuded. Apex of the dull pure white broad fore wings rectangular, somewhat obtuse, as in the European *hortuellus*, to which group *latellus* belongs, the hind margin nearly straight, and the fringes with a pearly and pale golden lustre. The markings consist in the above-mentioned very distinct black dot, two faint oblique ochreous streaks on the second half of the costa, and in a slender ochreous transverse line near hind margin, which is oblique and geminated from five-sixths of costa till vein 5, thence parallel to hind margin, single and faintly undulated; apex with an ochreous spot; hind margin in cells 1 *b* and 2 with another, which is adorned with two black dots; marginal line ochreous. Hind wings with fringes sordid white, unmarked; marginal line ochreous. Under side of fore wings dark grey, the hind sixth yellowish white, with two marginal black dots in cell 1 *b* and 2 as above. Neuration as in *hortuellus*.

Darjeeling; H. J. Elwes. Mongpo, 4000 ft.; Gammie.

251. *Crambus parallelus.*

Crambus parallelus, Zeller, Stett. Ent. Zeit., 1867, p. 389, pl. 2, f. 1.

Sikkim; H. J. Elwes.

252. *Crambus dividellus*, nov. spec.

Five specimens of 25—30 mm. expanse.

This apparently undescribed species belongs to the section C, d, v, of Zeller's genus *Crambus* ('Chilonid. et Crambid. genera et species,' p. 15), and is evidently allied to our European *tristellus* and *selasellus;* from both it is distinguished—1, by the bicolorous fore wings (the costal half being ochreous yellow and the inner ochreous brown); 2, by the want of the longitudinal white stripe, which is always found in *selasellus*, and occurs in several varieties of *tristellus*. Besides (and this is not the least considerable, though not the most apparent difference), the front is rounded, without the obtuse projection of *selasellus* and *tristellus*. Antennæ setaceous, nearly bare, brownish grey. Labial palpi thrice as long as the head, brownish grey. Front and vertex pale ochreous yellow. Thorax with collar and patagiæ ochreous brown. The form of the fore wings is as in *selasellus*, the costa a little stronger, and also more regularly rounded, without depression before the more acute apex; on the contrary, the hind margin is a little more sinuate. The costal half of fore wings is of a rather pure but pale dull ochreous yellow, and the inner impure, greyish, dull ochreous brown; the limit of the two colours is, however, neither sharp nor quite straight; on the bases of the veins 3 and 4 the brown advances a little towards the costa and beyond it retreats towards the anal angle, leaving only the veins 3 and 4 brown. Besides, towards the base of the wing, the ochreous yellow of the costal half is sullied by ochreous grey-brown. In the fold a short ill-defined ochreous yellow longitudinal stria is issued by the base; it does not reach the half of cell 1 *b*, and between its end and the inner margin of discoidal cell we perceive a small ill-defined dark grey spot; marginal line marked with minute black spots. The fringes have a silky lustre and are ochreous brown, with exception of the basal half from the apex till veins 5 or 4, which is more or less well-defined white. Hind wings white, a little glossy, dusted with grey on the apical third. Fringes white. Under side of fore wings grey, the apex and hind margin paler, first yellowish, outwardly whitish. Hind wings as above. Abdomen grey, with

whitish under side and yellowish anal brush. Legs yellowish. Nervulation as in *selasellus*. Vein 11 of fore wings more oblique.

Sikkim, Tonglo, 10,000 ft.; H. J. Elwes.

[This species was common in July in the grassy country along the Sundukpho range.—H J. E.]

253. *Crambus aurivittatus.*

Crambus aurivittatus, Moore, Descr. Atk., p. 226 (1887).

[A distinct species with broad golden band on the hind margin of the fore wing, which I have seen in the Atkinson collection.—H. J. E.]

Darjeeling; Atkinson.

[Another species or variety of this, in which the upper edge of the band is toothed, is *Crambus argyroptera*, Butler, *fide* Moore, also from Darjeeling, in the Atkinson collection.—H. J. E.]

[*Note.*—This paper was written by Mr. Snellen on the collections made by the late Otto Möller and myself in Sikkim, and forms the second part of the Catalogue of the Lepidoptera of Sikkim, which I commenced in 1887, and of which the first part was published in Trans. Ent. Soc. Lond., 1888.

I can add but little to the remarks which I then made; but, owing to the untimely death of Mr. Möller, I am unable to give full particulars of the localities and seasons of the specimens in his collection, of which a set is now preserved in the Indian Museum, Calcutta. It may be said, however, that they were mostly collected by natives at low elevations in the valleys of the Great and Little Rangit rivers, near Darjeeling, and many of the species found at these low elevations have an extremely wide distribution in India and the tropics.

The species which occur only at higher elevations are not so wide-ranging as a rule, and but very few species are as yet known to occur as high as 10,000 ft.

Mr. Snellen has had great difficuly in identifying many of Walker's and Moore's descriptions, but I have, with the kind assistance of Mr. Warren, who has recently arranged the *Pyralidæ* of the British Museum, checked

the doubtful identifications, and in some few cases suggested corrections to Mr. Snellen.

For all which is signed with my initials I alone am responsible, and I have to offer my hearty thanks to our distinguished foreign member for the careful labour he has devoted to this work.

In order to facilitate the references I have given the number of each species in Swinhoe and Cotes' 'Catalogue of the Moths of India,' citing it as "S. & C." No. —H. J. Elwes.]

Explanation of Plates XIX. & XX.

PLATE XIX.

Figs. 1, 1*a*. *Cydalima Elwesialis*, Snellen.
2. *Conchylodes paucipunctalis*, Snellen.
3, 3*a*. *Pannucha asopialis*, Snellen.
4. *Cledeobia angulifascia*, Snellen.
5. *Scoparia pulveralis*, Snellen.
6, 6*a*. *Omphisa repetitalis*, Snellen.

PLATE XX.

Figs. 1, 1*a*. *Phalangiodes rivulalis*, Snellen.
2, 2*a*. *Pannucha vicinalis*, Snellen.
3, 3*a*. *Oryba conspicualis*, Snellen.
4. *Chilo ambiguellus*, Snellen.
5, 5*a*. *Crocidophora flavicilialis*, Snellen.
6, 6*a*. *Filodes sexpunctalis*, Snellen.

XIX. *On a species of Aphideous insects infesting the bread-fruit trees in Ceylon.* By Prof. J. O. Westwood, M.A., F.L.S., &c.

[Read July 2nd, 1890.]

Plate XXI.

The almost universal prevalence of species of the plant-sucking family, *Aphidæ*, will cause no surprise to entomologists in learning that another member of that family should have been found to occur on the bread-fruit tree in Tropical Asia. For a knowledge of this fact we are indebted to Mr. E. Ernest Green, nephew of Mr. Staniforth Green, of Colombo, Ceylon, who has on various occasions supplied me with materials which have enabled me to lay interesting matter before the Entomological Society of London.

Siphonophora Artocarpi.

Læte viridis (vivens et post ultimam exuviationem) vel postea magis infuscata, thorace et fasciis transversis abdominalibus fuscis; oculis sanguineis; alis hyalinis venis gracilibus, anticis ramulo 2do venæ post-costalis pone medium ejus valde arcuato; corniculis melliferis longissimis, divergentibus setosis, obscurioribus. Species magnitudine mediocri.

On the 21st June, 1889, Mr. E. E. Green found a colony of these Aphideans feeding on the young leaves of the Jack-tree (*Artocarpus integrifolia*) in Ceylon. The following is Mr. Green's description, taken from the living specimens, given in his communication to his uncle, and forwarded by him to me :—

"The larvæ and pupæ are of a bright pale green colour (changing to dull buff when placed in spirits); the honey-secreting tubes, cornicles, or nectaries are pale brownish, and the eyes crimson. The imago-state is also bright green immediately after the final moult, but soon darkens to brownish green; with the thorax and bands across the abdomen brown; the eyes are

bright crimson. The antennæ, legs, and honey-tubes are brownish, and the space below the eyes is brown."

Mr. E. E. Green has sent me a small bottle with specimens of this curious aphis in all its stages; asexual females, winged and wingless nymphs and larvæ, the last-named individuals varying from a very minute size to that of the nymphs or pupæ. Mr. Green watched some of the asexual females producing their living young, which are emitted tail foremost, and seem to commence feeding as soon as they are deposited.

A striking character of the species consists in the enlarged size of the cornicles or honey-secreting tubes springing from the sixth abdominal ring near the extremity of the body, common to many of the species of Aphides, especially in those composing the division to which Koch thence gave the generic name of *Siphonophora*. These tubes are stated by Mr. Green to be carried diverging and elevated at an angle of 45°; they are sometimes as long as the whole remainder of the insect, and are strongly setose, the fine bristles set on nearly at right angles; many of the larvæ carried a drop of milky fluid at the ends of their tubes. When alarmed the insects suddenly dropped from the leaves to the ground. They are very active, and walk rapidly.

The drawings which I have made to illustrate this species are from different individuals, communicated by Mr. E. E. Green.

The first figure (fig. 1) represents a winged viviparous female. The wings are of the ordinary large size of the *Siphonophoræ* (*Aphis rosæ*, &c.), the first branch of the post-costal vein being short and oblique; the next branch is very strongly curved beyond its centre, differing in this respect from the wings of every other known species of the family; the three branchlets of the third branch are of the ordinary character and form. The hind wing is rather narrowly oval, with a minute hooklet beyond the middle of the anterior or costal margin (fig. 4).* The honey-secreting tubes are exceptionally

* The post-costal vein of the hind wings in *Siphonophora* has only two branches. Mr. Buckton ('Brit. Aphides,' i., 28) calls this vein the cubitus, but it clearly represents the branched vein of the fore wing, and not the slender simple veinlet of the fore wings, to which he gives the name of the cubitus.

long and setose. The front of the head is rather irregular and slightly setose. The antennæ are beautiful objects for the microscope, arising from two or three thickened, very short, joints (fig. 2), and followed by long slender joints, each of which is composed of a vast number of minute annuli, very finely setose, the extremity of the terminal joint being shown in fig. 3.

The nymph or pupa (fig. 5) is comparatively narrow, and exhibits the rudimental wings of a small size at the sides of the "alitrunk," as Mr. Kirby styled the two wing-bearing segments conjointly; the body is terminated by a small conical point. The rostrum or proboscis (fig. 6) extends along the breast to nearly the base of the middle pair of legs (which are long and slender). In the accompanying drawing it is extended laterally beyond the sides of the prothorax.

The full-grown apterous viviparous female (fig. 7) has the body much swollen and rounded, without any traces of wings or wing-covers; the antennæ are very long and slender. The front of the head is represented in fig. 8, and the antennæ greatly magnified in fig. 9.

With regard to the destruction of the green aphides on various plants, Mr. Staniforth Green states to me, in a recent letter, that although the use of Paris-green, so strongly suggested by the American economic entomologists, has been hitherto tried in a feeble way, and without producing much diminution of these pests, it being considered that it would be too costly to be applied on a large scale.

Explanation of Plate XXI.

Fig. 1. The winged viviparous female.
2. Side of head and base of antenna of ditto.
3. Extreme tip of the antenna.
4. Hind wing of ditto.
5. The pupa.
6. The proboscis of ditto.
7. The apterous viviparous full-grown female.
8. Front of head of ditto.
9. Side of head and right antenna.

All the figures are highly magnified.

XX. *Further notes on the synonymy of the genera of Noctuites.* By Arthur G. Butler, F.L.S., F.Z.S., &c.

[Read September 3rd, 1890.]

To some of the groups already treated of, I have a few additional notes to record; I shall therefore take them in the order in which they now stand in the Museum cabinets.

CYMATOPHORIDÆ.

Prometopus, *Guén.*

1. *Prometopus inassueta.*

Prometopus inassueta, Guenée, Noct., i., p. 38, n. 42 (1852).

Bryophila dorsivaria, Walk., Lep. Het., 15, p. 1648 (1858).

Australia and Tasmania.

M. Guenée placed this genus in his heterogeneous family *Bombycoidæ;* it is, however, allied to *Cymatophora.*

NOCTUIDÆ.

Ochropleura, *Hübn.*

In the Grote collection I found an example of *O. plecta*, which is labelled, probably in error, "*Valeria grotei*, Morr."

It is a very remarkable thing that *Ochropleura*, a genus founded by one of Mr. Scudder's favourite authors, is amongst the many lepidopterous genera omitted from the 'Nomenclator Zoologicus.'

Mentaxya, *Hübn.**

Eugrapha, Hübner = *Ariathisa*, Walk.

1. *Mentaxya amatura.*

Agrotis amatura, Walker, Lep. Het., 15, p. 1700 (1858).

* This genus is extremely close to *Anicla*, Grote, which may have to be amalgamated with it.

Port Natal.

This species, in the Zeller collection, is labelled "*Agrotis trisema*, Z.," but I do not know whether he described it. Walker incorrectly associated two examples with two of an apparently unnamed species as *A. albifrons*, Hübn., which, however, is distinct.

21 *Mentaxya rimosa.*

Agrotis rimosa, Guenée, Noct., i., p. 277, n. 446 (1852).
A. varia, Walker, Lep. Het., Suppl., 2, p. 694 (1865).

Cape of Good Hope.

3. *Mentaxya muscosa.*

Mentaxya muscosa, Hübner, Zutr. Exot. Schmett., 10, 414, figs. 827, 828.
Diphtera cumulata, Walker, Lep. Het., Suppl., 2, p. 613 (1865).

Cape Town.

4. *Mentaxya furcifera.*

Agrotis furcifera. Walker, Lep. Het., 15, p. 1699 (1858).

United States.

This is *A. brocha*, Morrison. I do not know which name has priority.

Anicla, *Grote.*

1. *Anicla incivis.*

Agrotis incivis, Guenée, Noct., i., p. 274, n. 441 (1852).

United States to Brazil.

This is proved, by a comparison of the type-specimens, to be *A. alabamæ*, Grote. *Prodenia pauper*, Butl., described from a female received from Jamaica, is only a dwarfed form of the same species.

2. *Anicla ignicans.*

Agrotis ignicans, Guenée, Noct., i., p. 274, n. 440 (1852).
A. prodenoides, Walker, Lep. Het., 10, p. 354, n. 113 (1856).

S. America generally.

In the species of *Anicla* the secondaries are white, as in most of the species of *Mentaxya*, but they are more opaline and less thickly scaled.

Xylophasia, *Stephens.*

I am unable to see any reason for ignoring this very natural group of moths, the bulk of which can be distinguished at a glance by the character of their markings; they doubtless only form a subgroup of *Mamestra*, so far as structure goes, but it is convenient to keep them separate.

1. *Xylophasia rurea.*

Noctua rurea, Fabricius, Sp. Ins., ii., p. 240.

Europe and United States.

I can discover no characters by which to distinguish *X. cultuosa*, Grote, from this species.

2. *Xylophasia lignicolora.*

Xylophasia lignicolora, Guenée, Noct., i., p. 140, n. 221 (1852).

United States.

X. quænita, Grote, only differs from *X. lignicolora* in its slightly paler colouring, and *X. aurantiicolor* only appears to be a darker form of the same.

3. *Xylophasia cariosa.*

♀, *Xylophasia cariosa*, Guenée, Noct., i., p. 144, n. 232 (1852).

United States.

Hadena idonea of Grote is the male of this species; the females labelled *H. cariosa* in the Grote collection do not agree with Guenée's type, and, in my opinion, represent a distinct and altogether a finer species.

It seems to be generally supposed, in the States, that the whole of M. Guenée's types are in the possession of M. Oberthür. An examination of the descriptions in the three volumes of the 'Noctuélites,' or, indeed, of any of the volumes of the 'Histoire Naturelle' (Lépidoptères) will show that nearly the whole of the N. American species were described from specimens lent to the author

by Mr. Doubleday, and many of the East Indian species from specimens in the Museum of the E. I. Company. All these types, labelled by Guenée himself, are in the British Museum collection.

ALIBAMA, *Moeschl.*

1. *Alibama punctirena.*

Hadena punctirena, Walker, Lep. Het., xi., p. 586, n. 64 (1857).

H. terens, Walker, *l. c.*, n. 65 (1857).

St. Domingo, Venezuela, Guadaloupe. Coll. B. M.

This species appears to me to be better placed next to *Dipterygia* than elsewhere.

AXYLIA, *Hübn.*

1. *Axylia eridania.*

Phalæna eridania, Cramer, Pap. Exot., iv., p. cxxxiii., fig. F (1882).

Leucania externa, Walker, Lep. Het., 9, p. 114, n. 85 (1856).

Prodenia strigifera, Walker, *l. c.*, 15, p. 1678 (1858).

South America.

The species regarded as the male by Cramer must bear the name.

ANTACHARA, *Walk.*

Barely separable from the preceding genus. Associated with *Xylophasia* by M. Guenée.

1. *Antachara diminuta.*

Xylophasia diminuta, Guenée, Noct., i., p. 141, n. 223 (1852).

Antachara rotundata, Walker, Lep. Het., 15, p. 1741, n. 1 (1858).

Laphygma lignigera, Walker, *l. c.*, Suppl, 2, p. 650 (1865).

Brazil.

X. denterna of Guenée is a species of this group: we have it from Rio Janeiro.

2. *Antachara phytolaccæ.*

Phalæna phytolaccæ, Smith Abbot, Lep. Ins. Georgia, ii., p. 193, pl. 97.

Xylina inquicta, Walker, Lep. Het., xi., p. 632, n. 22 (1857).

Prodenia ignobilis, Butler, Proc. Zool. Soc., 1878, p. 485.

North and South America.

This species varies in tint and in the prominence or the reverse of the black stigma at the end of the cell of primaries.

3. *Antachara albula.*

Xylina albula, Walker, Lep. Het., xi., p. 629, n. 16 (1857).

Laphygma orbicularis, Walker, *l. c.*, p. 719.

St. Domingo, Honduras, Callao.

Allied to the preceding, though clearly a distinct species.

Morrisonia, *Grote.*

1. *Morrisonia ewingii.*

Noctua (*Xylophasia ?*) *ewingii*, Westwood, Proc. Ent. Soc. Lond., ii., p. lv., pl. xx., fig. 1 (1837).

Cloantha composita, Guenée, Noct., ii., p. 114, n. 832 (1852).

Leucania dentigera, Butler, Cist. Ent., ii., p. 542 (1880).

Australia, Tasmania, New Zealand, United States.

The last-mentioned locality is based upon a specimen in the Grote collection, undoubtedly of this species, labelled "*Morrisonia peracuta*, Morr." The species will probably be found to have a far wider geographical range than has been supposed: Walker made the astonishing blunder of identifying it with *Drymonia dimidiata*, H.-Sch.

Auchmis, *Guén.*

1. *Auchmis intermedia.*

Cloantha intermedia, Bremer, Lep. Ost.-Sibiriens, p. 53, tab. v., fig. 13 (1864).

Auchmis sikkimensis, Moore, Proc. Zool. Soc., 1867, p. 49, pl. vi., fig. 15.

India, Japan, South Africa.

LEUCANIA, *Ochs.*

1. *Leucania l-album.*

Phalæna-Noctua l-album, Linnæus, Syst. Nat., xii., p. 850.
Leucania bistrigata, Moore, Proc. Zool. Soc., 1881, p. 334.
L. penicillata, Moore, *l. c.*, p. 335.
Europe and India.

I have elsewhere pointed out that the slight characters on which the Indian species were based are very inconstant.

With *L. insueta* of Guenée, Walker associated four specimens of *L. adonea*.

2. *Leucania albilinea.*

Leucania albilinea, Hübner, Zutr. Exot. Schmett., p. 25, n. 169, figs. 337, 338.
L. diffusa, Walker, Lep. Het., ix., p. 94, n. 35 (1856).
L. moderata, Walker, *l. c.*, p. 114, n. 86 (1856).
Heliophila harveyi, Grote (see Check List, p. 30, n. 619).
Leucania chilensis, Butler, Trans. Ent. Soc. Lond., 1882, p. 115, n. 4.
North and South America.

3. *Leucania humidicola.*

Leucania humidicola, Guenée, Noct., i., p. 90, n. 137 (1852).
L. extenuata, Guenée, *l. c.*, n. 138.
L. dorsalis, Walker, Lep. Het., ix., p. 98, n. 43 (1856).
S. America.

L. humidicola is slightly paler than *L. extenuata*, but is undoubtedly the same species.

4. *Leucania loreyi.*

Leucania loreyi, Duponchel, Lep. France, vii., 1, p. 81; pl. 105, fig. 7 (1827).
L. collecta, Walker, Lep. Het., ix., p. 105, n. 63 (1856).
L. thoracica, Walker, *l. c.*, p. 106, n. 68 (1856).
L. denotata, Walker, *l. c.*, p. 107, n. 70 (1856).
Europe, Japan, India.

5. *Leucania percussa.*

Leucania percussa, Butler, Proc. Zool. Soc., 1880, p. 674, n. 55.

L. insularis, Butler, *l. c.*, n. 56.

Formosa.

I believe these two must be slightly different forms of the same species; in any case *L. insularis* is much rubbed, and ought not to have been described.

6. *Leucania multilinea.*

Leucania multilinea, Walker, Lep. Het., ix., p. 97, n. 41 (1856).

Canada.

This is the species described by Grote as *L. lapidaria*, Grote: it is quite distinct from *L. commoides*, under which Grote gives "*L. multilinea*, Walk., *in litt.*," as a synonym.

7. *Leucania phragmitidicola.*

Leucania phragmitidicola, Guenée, Noct., i., p. 89, n. 136 (1852).

United States.

This species is quite distinct from the Haytian insect, identified with it by Walker, being very closely allied to the preceding, *L. multilinea:* it was correctly identified by Grote.

8. *Leucania amens.*

Leucania amens, Guenée, Noct., i., p. 88, n. 133 (1852).

South Africa.

Probably only a pale form (the prevalent one) of *L. torrentium*, Guén.; the differences are slight, all the markings being alike.

9. *Leucania exterior.*

Leucania exterior, Walker, Lep. Het., ix., p. 106, n. 66 (1856).

L. designata, Walker, *l. c.*, p. 107, n. 69 (1856).

India.

Both of the types are now in the Museum Collection, and prove to be inseparable as species.

"*Leucania*" *disjuncta*, Walker, is an *Agrotis*; *L. propria* and *L. semivittata* must be transferred to *Ommatostola*.

10. *Leucania extincta*.

Leucania extincta, Guenée, Noct., i., p. 79, n. 107 (1852).

United States.

This is proved, by a comparison of the types, to be the *Heliophila ligata* of Grote.

11. *Leucania insueta*.

Leucania insueta, Guenée, Noct., i., p. 81, n. 113 (1852).

United States.

Allied to *L. comma*. The type only differs from that of *L. adonea*, Grote, in the less distinctly whitish costal border and veins of primaries: it is quite possible that they may prove to be forms of the same species, but I would always rather err on the side of allowing too many species to stand rather than too few; it is always easy to put things together, but it often requires careful study to discriminate between closely-allied species.

12. *Leucania linita*.

Leucania linita, Guenée, Noct., i., p. 81, n. 114 (1852).
L. insecuta, Walker, Lep. Het., Suppl., 2, p. 625 (1865).
L. intermissa, Walker, *l. c.*, p. 626.

United States and Shanghai.

This is also identical with *L. amygdalina*, Harvey. The Shanghai specimens are indistinguishable from the American. I have already pointed out (Trans. Ent. Soc. Lond., 1882, p. 113) that *L. decolorata* of Blanchard is only a pale form of *L. impuncta*, Guén.

"*L. pallens*" of the United States agrees absolutely with the European *L. straminea*. The two forms have practically the same characters, and if received from any extra-European locality would never have been considered distinct; indeed, it is possible to find examples which cannot with certainty be referred to one form

rather than the other. *L. straminea* differs chiefly in the generally more prominent pale longitudinal streak above the median vein of the primaries, and the better-defined black or dark markings. Not having bred both from the egg, I keep them separate in the collection.

The *L. juncicola* of Walker is not the species so named by M. Guenée, but is the *L. adjusta* of Grote. The true *L. juncicola* seems to be very closely allied to, if distinct from, *L. scirpicola*.

In the Index to 'Illustrations of Typical Lepidoptera-Heterocera,' I inadvertently placed *L. griseifascia*, Moore, as a synonym of *L. commoides;* it really is a dark form of *L. percisa* (Proc. Zool. Soc., 1888, p. 410).

The following is a very variable species, which has received many names :—

13. *Leucania unipuncta.*

Noctua unipuncta, Haworth, Lep. Brit., p. 174, n. 37 (1810).

Typical form. United States, Chili, New Zealand, Azores. Coll. B. M.

This is a large reddish form of the species in which the white dot on the primaries is very prominent. I have seen no undoubted European examples of the species, and the few specimens which may have been obtained were probably accidentally imported.

Var. *saccharivora.*

Leucania saccharivora, Butler, Trans. Ent. Soc. Lond., 1882, p. 115.

Chili, India, and New Zealand. Coll. B. M.

Smaller than the typical form, and of a brighter reddish colour ; the white spot obsolete.

Var. *antica.*

Leucania antica, Walker, Lep. Het., ix., p. 100, n 52 (1852).

L. adusta, Moore, Proc. Zool. Soc., 1881, p. 335.

Western coast of America, Venezuela, Darjiling. Coll. B. M.

About the same size as the preceding variety, but much paler, the primaries being pale testaceous, with ill-defined dusky markings, and the secondaries almost white, with more or less defined dusky border, darkest towards apex. The Indian examples show the dusky border distinctly as a broad subapical patch, varying in intensity in different individuals; one of the examples from Venezuela has a similar though less prominent patch.

Var. *trifolii*.

Leucania trifolii, Butler, Trans. Ent. Soc. Lond., 1882, p. 114.

Sao Paulo, Chili, Canada, Japan, Java, N.W. India, New Zealand, and Flores. Coll. B. M.

Altogether a greyer form, with prominent pale discoidal spots, well-defined dark oblique apical streak, and dusky secondaries.

Var. *extranea*.

Leucania extranea, Guenée, Noct., i., p. 77, n. 104 (1852).

United States, "Europe," Darjiling, Azores, Flores. Coll. B. M.

A darker form than the preceding, and generally larger.

Var. *convecta*.

Leucania convecta, Walker, Lep. Het., xi., p. 711 (1857).

Moreton Bay. Coll. B. M.

The primaries almost uniformly greyish, with testaceous reflections; the white dot almost lost in a blackish spot at the end of the cell; the secondaries whitish, with dusky veins and border somewhat as in the darkest form of var. *antica*.

Var. *separata*.

Leucania separata, Walker, Lep. Het., Suppl., ii., p. 626 (1865).

Japan, Shanghai, N. W. India, Goya, Chili, Kansas. Coll. B. M.

Scarcely separable from the preceding; the specimens

have a washed-out, faded appearance; the primaries pale testaceous, with indistinct markings; the secondaries greyish white, with dusky veins and borders.

I have not the least doubt that the whole of the above forms are mere variations of one widely-distributed species; at the same time it is doubtful whether the whole of the forms occur together, as, in a long series, Mr. Edmonds only had the two varieties, *L. trifolii* and *saccharivora*, whilst the typical form, received subsequently from Talcahuano, is only like a duller, darker specimen of the latter variety: most of the varieties occur in N. Western India, but I have not seen typical *L. unipuncta*, var. *antica*, or var. *convecta* from there.

HYPHILARE, *Hübn.*

This is the *Mythimna* of Walker, slightly modified: it will include *H. albipuncta*, *lithargyria*, *rudis*, *albicosta*, *fraterna*, *rufipennis*, *placida*, *pseudargyria*, *singularis*, *formosana*, *turca*, *grandis* and *divergens*, and perhaps *obusta*.

1. *Hyphilare pseudargyria.*

Leucania pseudargyria, Guenée, Noct., i., p. 74, n. 94 (1852).

United States.

The type of this species agrees exactly with the var. *callida* of Grote: in the Grote collection this form is labelled "var. *obusta*, Guen.," but the type of "*Leucania obusta*" is a very distinct species, having densely ciliated antennæ, and darker by far in colouring even than the European *H. turca*. I very much doubt whether it can be placed in the same genus.

SESAMIA, *Guenée.*

1. *Sesamia incerta.*

Leucania incerta, Walker, Lep. Het., ix., p. 103, n. 58 (1856).

Nonagria intestata, Walker, *l. c.*, p. 130, n. 23 (1856).

South Africa (*Sir A. Smith*). Coll. B. M.

2. *Sesamia abdominalis.*

Nonagria abdominalis, Walker, Lep. Het., ix., p. 131, n. 24 (1856).

Mythimna robusta, Walker, *l. c.*, xi., p. 710 (1857).

Australia. Coll. B. M.

3. *Sesamia ciliata.*

Leucania ciliata, Walker, Lep. Het., ix., p. 110, n. 77 (1856).
Tæniocampa assimilis, Walker, *l. c.*, xv., p. 1708 (1858).
Leucania curta, Walker, *l. c.*, Suppl., ii., p. 627 (1865).
Australia. Coll. B. M.

PLATYSENTA, *Grote.*

1. *Platysenta videns.*

Leucania videns, Guenée, Noct., i., p. 78, n. 106 (1852).
Nonagria? indigens, Walker, Lep. Het., xi., p. 713, n. 3 (1857).
Platysenta atriciliata, Grote (see Check List, p. 30).
United States. Coll. B. M.

The type from Florida is identical with the species subsequently described by Walker and Grote.

Nonagria irregularis, Walker, and *Leucania proscripta*, Walker, may be referred to this genus.

NONAGRIA, *Ochs.*

"*Nonagria*" *geminipuncta*, Hatchett (an example of which stood in Zeller's series of *N. nexa*), has simple antennæ, and is congeneric with *Oria* (*Tapinostola*) *fulva*.

OMMATOSTOLA, *Grote.*

I have been obliged to extend this genus to include the following, most of them hitherto having been placed under *Nonagria*:—*N. cannæ, lutosa, sparganii, arundinis, polita* of Walker (Shanghai), *nexa, propria*, Wlk. (New Zealand), *photophila*, Butl. (Hawaiian Islands), *semivittata*, Wlk. (New Zealand). The antennæ of these species are of the same character as those of *O. lintneri*, being thicker and more densely ciliated than in the little dull-coloured species which remain in *Nonagria*, viz.:—*N. dissoluta*, Treit., *punctifinis*, Walk., and *neurica*, Hübn. The *Leucania sulcana* of Fereday, which vaguely resembles *O. semivittata*, appears to me to be an *Arsilonche*: it is a little more developed in every way than *A. albovenosa*, the palpi, antennæ, legs, and wings being all longer; the primaries are buff instead of greyish or whity-brown, and the secondaries and abdomen are blackish instead of pure white; the pattern of the primaries, however, is almost identical.

ORTHODES, *Guén.*

I have already stated (Ann. and Mag. Nat. Hist., ser. 6, vol. vi., p. 96) that the type of this genus, *O. t-nigrum*, must be placed here, the whole of Guenée's other so-called *Orthodes* being referred to *Dyschorista*. *Orthodes* will now include *O. t-nigrum* from Brazil, and *O. exempta* (*Leucania exempta*, Walk.) from Ceylon.

MYCTEROPLUS, *Herr.-Sch.*

Zotheca, Grote, is synonymous with this genus.

SPODOPTERA, *Guén.*

"*Spodoptera*" *pecten* of Guenée, although it closely resembles *S. mauritiæ* in colouring and general pattern, is structurally quite distinct, and must either be placed in or near to the genus *Agrotis*.

1. *Spodoptera mauritia.*

♀, *Hadena mauritia*, Boisduval, Faune, Ent. de Madag., p. 92, pl. 13, fig. 9 (1833).
♂, *Spodoptera nubes*, Guenée, Noct., i., p. 155, n. 246 (1852).
♀, *S. filum*, Guenée, *l. c.*, n. 248 (1852).
♀, *Prodenia infecta*, Walker, Lep. Het., ix., p. 196, n. 12 (1856).
♂, *P. insignata*, Walker, *l. c.*, p. 197, n. 14 (1856).
♀, *Caradrina triturata*, Walker, *l. c.*, x., p. 295, n. 30 (1856).
♀, *Agrotis transducta*, Walker, *l. c.*, p. 344, n. 91 (1856).
♂, *Prodenia permunda*, Walker, *l. c.*, xi., p. 723 (1857).
♀, *Laphygma gratiosa*, Walker, *l. c.*, Suppl., ii., p. 651 (1865).
♂, *L. squalida*, Walker, *l. c.*, p. 652 (1865).
♂, *Prodenia venustula*, Walker, *l. c.*, p. 654 (1865).
♂, *Celæna bisignata*, Walker, *l. c.*, p. 679 (1865).
♀, *Agrotis aliena*, Walker, *l. c.*, p. 694 (1865).
♀, *A. bisignata*, Walker, *l. c.*, p. 702 (1865).
♂, *Hadena obliqua*, Walker, *l. c.*, iii., p. 736 (1865).

Africa, Asia, and Australia. Coll. B. M.

It is remarkable, considering what a number of

species this insect was divided into, how little, comparatively, it varies; the sexes differ considerably, owing to the obliteration of the white markings in the female, but otherwise there is nothing beyond intensity of colour to account for the manifold synonymy noted above.

2 *Spodoptera exempta*.

♂, *Agrotis exempta*, Walker, Lep. Het., x., p. 355, n. 114 (1856).
♀, *Prodenia bipars*, Walker, *l. c.*, xi., p. 724 (1857).
♂, *P. ingloria*, Walker, *l. c.*, xv., p. 1679 (1858).
Africa, Australia, and Hawaiian Islands. Coll. B. M.

3. *Spodoptera frugiperda*.

♂, ♀, *Phalæna frugiperda*, Smith & Abbot, Lep. Georg., ii., p. 191, pl. 96 (1797).
♂, *Prodenia signifera*, Walker, Lep. Het., ix., p. 193, n. 5 (1856).
♂, *P. plagiata*, Walker, *l. c.*, p. 194, n. 6 (1856).
North and South America. Coll. B. M.
This is also *P. autumnalis* of Riley.

Prodenia, *Guenée*.

This genus differs from *Spodoptera* in the fact that the antennæ of the males are very delicately ciliated, especially towards the base, and in the much greater similarity of the sexes.

1. *Prodenia littoralis*.

Hadena littoralis, Boisduval, Faune Ent. de Madag., p. 91, pl. 13, fig. 8 (1833).
♂, ♀, *Noctua retina*, Freyer, Neuere Beiträge, v., p. 161, n. 865, pl. 478, figs. 2, 3 (1845).
♂, ♀, *Prodenia ciligera*, Guenée, Noct., i., p. 164, n. 260 (1852).
♀, *P. testaceoides*, Guenée, *l. c.*, p. 165, n. 262 (1852).
♂, *P. subterminalis*, Walker, *l. c.*, p. 196, n. 13 (1856).
♂, *P. glaucistriga*, Walker, *l. c.*, p. 197, n. 15 (1856).
♂, *P. declinata*, Walker, *l. c.*, xi., p. 723 (1857).
Africa, Asia, Australia. Coll. B. M.
P. testaceoides is a slight variety, and *P. declinata* a starved specimen.

2. *Prodenia ornithogalli.*

Prodenia ornithogalli, Guenée, Noct., i., p. 163, n. 258 (1852).

United States. Coll. B. M.

This is *P. lineatella*, Harvey, and *P. commelinæ*, Riley: I believe the following form to be only a variety, corresponding with the var. *testaceoides* of *P. littoralis*.

2*a*. *Prodenia eudiopta.*

Prodenia eudiopta, Guenée, Noct., i., p. 164, n. 261 (1852).

United States. Coll. B. M.

This is *P. flavimedia*, Harvey.

P. ornithogalli is the American representative of *P. littoralis;* the two forms are extremely closely allied, but that of the New World is constantly of a more uniform dark sepia-brown tint, upon which the markings stand out more sharply; the oblique dash at the end of the cell also appears to be shorter.

3. *Prodenia commelinæ.*

Phalæna commelinæ, Smith & Abbot, Lep. Ins. Georgia, ii., p. 189, pl. 95 (1797).

P.-Noctua marmorea, Sepp, Surin. Vlind. i., pl. 51.

North and South America. Col. B. M.

Laphygma, *Guén.*

1. *Laphygma exigua.*

Noctua exigua, Hübner, Samml. Eur. Schmett., Noct., fig. 362.

♂, *Caradrina venosa*, Butler, Ent. Month. Mag., xvii., p. 7 (1880).

Var. *Laphygma cycloides*, Guenée, Noct., i., p. 157, n. 250 (1852).

L.? caradrinoides, Walker, Lep. Het., ix., p. 190, n. 8 (1856).

L. flavimaculata, Harvey (see Grote, Check List, under *Caradrina*, p. 30, n. 651).

Europe, Asia, Africa, N. America, and Honolulu. Coll. B. M.

Walker identified two normal specimens from the Cape as "*L. cycloides*," but redescribed typical *L. cycloides* (which agrees with *L. flavimaculata* in being a little larger than most European examples) as *L. caradrinoides*.

2. *Laphygma orbicularis.*

Caradrina orbicularis, Walker, Lep. Het., x., p. 294, n. 26 (1856).

C. præterita, Walker, *l. c.*, n. 27 (1856).

South Africa. Coll. B. M.

3. *Laphygma macra.*

Laphygma macra, Guenée, Noct., i. p. 157, n. 251 (1852).

L.? inepta, Walker, Lep. Het., ix., p. 190, n. 6 (1856).

North and South America. Coll. B. M.

4. *Laphygma cilium.*

Spodoptera cilium, Guenée, Noct., i., p. 156, n. 249 (1852).

S. insulsa, Walker, Lep. Het., Suppl., 2, p. 648 (1865).

Java. Coll. B. M.

"*Spodoptera*" *erica*, Butl., belongs to the same genus.

Eulaphygma, gen. nov.

Differs in the ciliated antennæ of the male.

Eulaphygma abyssinia.

Spodoptera abyssinia, Guenée, Noct., i., p. 154, n. 244 (1852).

S. capicola, Herrich-Schäffer, Lép. Exot., fig. 131 (1854).

Caradrina insignata, Walker, Lep. Het., x., p. 295, n. 29 (1856).

Laphygma procedens, Walker, Lep. Het., xi., p. 721 (1857).

South and West Africa. Coll. B. M.

I have no doubt that this wide-ranging species is the *S. abyssinia* of Guenée: it is astonishing that, when making three genera, this author failed to see how to

separate them correctly. All the species of *Laphygma* are so much alike that, unless examined with a lens in detail, they might be taken for one species; yet Guenée placed *L. cilium* and *E. abyssinia* into his genus *Spodoptera*, the species of which are far more like those of *Prodenia*.

CARADRINA, *Ochs.*

1. *Caradrina extima.*

Caradrina extima, Walker, Lep. Het., Suppl., 2. p. 687 (1865).

C. fidicularia, Morrison (see Grote, Check List, p. 30, n. 650).

Vancouver, California. Coll. B. M.

Specimens of this species in the Grote series are labelled as "*Caradrina multifera*," Walk.

2. *Caradrina quadripunctata.*

Noctua quadripunctata, Fabricius, Sp. Ins., ii., p. 214, n. 25.

Caradrina pulverosa, Walker, Lep. Het., x., p. 295, n. 28 (1856).

Europe and S. Africa. Coll. B. M.

3. *Caradrina selini.*

Caradrina selini, Boisduval, Ind. Méth., p. 137, n. 1096.

Europe. Coll. B. M.

Staudinger, in his Catalogue, p. 111, queries *C. noctivaga* as a variety of *C. selini*, and places *C. infusca* under it as a scarcely distinguishable slightly paler variety of *C. noctivaga*. In the Zeller collection I found the ordinary female of *C. selini*, which sex is always darker than the male, labelled as *C. infusca:* it is quite likely, therefore, that *C. noctivaga* and *infusca* are only ordinary females of *C. selini*, the sex having been not looked into.

4. *Caradrina himaleyica.*

Caradrina himaleyica, Kollar, Hügel's Kashmir, 4, p. 479 (1842).

C. arenacea, Moore, Proc. Zool. Soc., 1881, p. 349.

Dharmsala. Coll. B. M.

5. *Caradrina lenta.*

Caradrina lenta, Treitschke, Schmett. Eur., ii., p. 257.
C. tarda, Guenée, Noct., i., p. 243, n. 389 (1852).
Europe and N. America. Coll. B. M.

Hydrilla, *Boisd.*

1. *Hydrilla lepigone.*

Caradrina lepigone, Möeschler, Wien. Ent. Monatschr., 1860, p. 273.
C. miranda, Grote (see Check List, p. 30, n. 647).
Europe and United States. Coll. B. M.

Hyppa, *Dup.*

1. *Hyppa xylinoides.*

Hadena xylinoides, Guenée, Noct., ii., p. 106, n. 825 (1852).
Xylina contraria, Walker, Lep. Het., xi., p. 627, n. 10 (1857).
United States. Coll. B. M.

Miselia, *Guén.*

1. *Miselia extensa.*

♀, *Belosticta extensa*, Butler, Ann. & Mag. Nat. Hist., 5th ser., vol. 4, p. 357 (1879).
♂, *Miselia cinerea*, Butler, Trans. Ent. Soc. Lond., 1881, p. 184.
Japan. Coll. B. M.

Meganephria, *Hübn.*

The type of this genus is the so-called "*Miselia*" *bimaculosa*, which differs from *M. oxyacanthæ* in the non-serrated character of its antennæ.

1. *Meganephria latex.*

Aplecta latex, Guenée, Noct., ii., p. 78, n. 771 (1852).
Apamea demissa, Walker, Lep. Het., xi., p. 728 (1857).
United States. Coll. B. M.

Aplecta, *Guén.*

Mamestra stoliczkæ of Moore must be referred to this genus: in form it agrees best with *A. beanii*, Grote.

Pachetra, *Guén.*

Pachypolia Polia and *Dryobota* (part), Grote.

1. *Pachetra illocata.*

Hadena illocata, Walker, Lep. Het., xi, p. 758 (1857).
Eurois pluviosa, Walker, *l. c.*, Suppl., 3, p. 725 (1865).
Dryobota stigmata, Grote (see Check List, p. 28, n. 535).
United States. Coll. B. M.

Lamprosticta, *Hübn.*

Chariptera, Guén.

1. *Lamprosticta viridana.*

Phalæna viridana, Walch, Naturf., xiii., p. 28, pl. iii., figs. 5, *a*, *b* (1779).
Mamestra adjuncta, Walker (not Guenée), Lep. Het., xi., p. 726 (1857).
Europe. Coll. B. M.

Mr. Moore's genus *Karana* should be placed here.

Dichonia, *Hübn.*

D. convergens does not differ from *Mamestra: D. æruginea* therefore becomes the type of *Dichonia*. Walker founded a genus *Horma* for *D. æruginea*, but the specimens from which he described his genus were not what he supposed, but identical with *Derthisa scoriacea*, so that *Horma* must be suppressed.

Eumichtis, *Hübn.*

1. *Eumichtis plena.*

♂, *Erana plena*, Walker, Lep. Het., Suppl., 3, p. 744 (1865).
♀, *Dianthœcia viridis*, Butler, Cist. Ent., ii., p. 547 (1880).
New Zealand. Coll. B. M.

Dargida, *Walk.*

Eupsephopœctes, Grote.

1. *Dargida graminivora.*

Dargida grammivora, Walker, Lep. Het., ix., p. 202, n. 1 (1856).

Venezuela, Brazil. Coll. B. M.

This species, which is very closely allied to *D. procinctus*, Grote, is labelled, on Zeller's example, "*Noctua graminivora*, Moritz." Walker evidently misread the name received with the Museum specimens, which he quotes, "*grammivora*, Morritz [sic] MSS." The name "*grammivora*" is not only hybrid, but conveys no meaning; therefore I propose to restore the original reading to the species.

2. *Dargida graminicolans.*

Dianthœcia graminicolens [sic], Butler, Ann. & Mag. Nat. Hist., ser. 5, vol. 4, p. 295, n. 50 (1878).

Madagascar. Coll. B. M.

Pseudepunda, gen. nov.

Wings broader than in *Epunda*, the primaries more triangular, the antennæ simple and tapering instead of denticulated and ciliated.

Type. *Epunda bicolor*, Moore, from India.

Synvaleria, gen. nov.

Differs from *Valeria* in the submoniliform, somewhat flattened, antennæ of the male, no pectinations being present.

Type. *Valeria jaspidea*, Vill., from Europe.

I now return to *Mamestra*, to which I have to add some synonyms discovered since the publication of my last paper: naturally, as I have proceeded with the *Noctuæ*, I have seen cause to modify the arrangement of the genera, and doubtless many changes will yet have to be made before anything approaching to a natural classification can be obtained. One thing seems clear—that the numerous families made for the earlier groups are totally untenable.

MAMESTRA, *Ochs.*

1. *Mamestra binotata.*

Mamestra binotata, Walker, Lep. Het., Suppl., 2, p. 663 (1865).

Hadena extersa, Walker, *l. c.*, 3, p. 728 (1865).

H. curvata, Grote = *paviæ*, Behr. (see Grote, Check List, p. 27, n. 450).

United States. Coll. B. M.

2. *Mamestra inducta.*

Mamestra inducta, Walker, Lep. Het., ix., p. 236, n. 32 (1856).

M. septentrionalis, Walker, *l. c.*, Suppl., 2, p. 660 (1865).

Venezuela and United States. Coll. B. M.

This is labelled *M. lycarum*, H.-Sch., on Grote's specimens.

The *Mamestra insulsa* of Walker is an *Agrotis* allied to *A. albipennis* (males, having white secondaries, stood without a name in the Grote collection) : *M. expulsa*, Walker, is another closely allied species.

Mamestra nitida, Walker, is a distorted female of *Agrotis spina*, Guén., without secondaries.

Mamestra punctigera ♂, Walk., is the male of *Agrotis pastoralis* ♀, Grote.

Mr. Barrett pointed out to me that Walker's *Mamestra configurata*, from Mexico, is a slight variety of *M. brassicæ*.

HADENA (typical), *Guén.*

I only regard this as a group of *Mamestra*.

Hadena albifusa, Walk., represents *H. trifolii* in the United States, and may not be constantly different ; in our examples the primaries are far less uniformly coloured, the usual markings being defined upon a paler ground colour.

The following species referred to *Hadena* are synonymous :—

Hadena detracta, Walk. (*Mamestra claviplena*, Grote), which appears to me to be a *Pachnobia*.

Hadena sputatrix, Grote = *Apamea ? insignata*, Walk.

Hadena aspera, Walker, subsequently described as *Xylina provida* and *X. canescens*, Walk.

Hadena olivacea, Moore, is a synonym of *H. megastigma*, Walk., and belongs to the genus *Trachea*.

Hadena algeus, Grote, appears to me to be a *Calathusa*, and *H. cylindrica* a *Bryophila*.

Homohadena, *Grote*.

1. *Homohadena infixa*.

Xylophasia infixa, Walker, Lep. Het., ix., p. 178, n. 18 (1856).
Homohadena induta, Harvey (see Grote's Check List, p. 28, n. 198).

United States. Coll. B. M.

Euplexia, *Steph*.

1. *Euplexia semifascia*.

Hadena semifascia, Walk., Lep. Het., Suppl., 3, p. 737 (1865).
Euplexia cuprea, Moore, Proc. Zool. Soc., 1874, p. 578.

India. Coll. B. M.

2. *Euplexia confundens*.

Euplexia confundens, Walker, Lep. Het., xi., p. 544, n. 3 (1857).
E. exclusa, Walker, *l. c.*, p. 545, n. 4 (1857).
E. indocilis (part), Walker, *l. c.*, n. 5 (1857).
Hadena familiaris, Walker, *l. c.*, p. 597, n. 91 (1857).
Var. *H. extima*, Walker, *l. c.*, p. 599, n. 96 (1857).
H. punctisigna, Walker, *l. c.*, p. 600, n. 97 (1857).

Tasmania, Australia. Coll. B. M.

From the fact that Walker named this species six times in one volume, it might be supposed that it was very variable. It varies only in depth of colour, the pattern being almost identical throughout. The variety *extima* is the most distinct, and, if proved to be locally constant, might be kept separate.

3. *Euplexia sepultrix.*

Mamestra sepultrix, Guenée, Noct., i., p. 200, n. 317 (1852).
Hadena expulsa, Guenée, *l. c.*, 2, p. 93, n. 800 (1852).
Euplexia emergens, Walker, Lep. Het., xi., p. 544, n. 2 (1857).
E. indocilis (part), Walker, *l. c.*, p. 545, n. 5 (1857).
Hadena lutra, Walker, *l. c.*, p. 598, n. 93 (1857).

Tasmania and Victoria. Coll. B. M.

This species varies a little, and much in the same manner as the preceding species, with which it might easily be confounded; the outline of the central band of the primaries, nevertheless, is very different, and the lines immediately beyond it are equidistant.

The following genus is extremely like *Euplexia*, some of the species differing chiefly in their pectinated antennæ, the pattern being almost exactly the same.

NYSSOCNEMIS, *Led.*

1. *Nyssocnemis insignis.*

Euplexia insignis, Walker, Lep. Het., Suppl., 3, p. 724 (1865).
Xylina turbida, Walker, *l.c.*, p. 754 (1865).
Var. *Hadena skelloni*, Butler, Cist. Ent., ii., p. 547 (1880).

New Zealand. Coll. B. M.

H. skelloni must, I think, be a well-marked variety of this species, in which the large pale patches are wanting, and the ordinary pale lines are green: when examined with a lens the markings are seen to correspond exactly.

2. *Nyssocnemis lignifusca.*

♂, *Hadena lignifusca*, Walker, Lep. Het., xi., p. 603, n. 101 (1857).
♀, *H. debilis*, Butler, Proc. Zool. Soc., 1877, p. 385, pl. xlii., fig. 6.
Xylina spurcata, Walker, Lep. Het., xi., p. 631, n. 21 (1857).
Var. *X. vexata*, ♂, ♀, Walker, Lep. Het., Suppl. 3, p. 755 (1865).

Var. *Hadena mutans*, ♂, ♀, Walker, Lep. Het., xi., p. 602, n. 100 (1857).

Mamestra acceptrix, ♀, Felder, Reise der Novara, Lep. iv., pl. cix., fig. 19.

New Zealand. Coll. B. M.

This is a very common and variable species, some of the forms of which bear a considerable resemblance to *Euplexia sepultrix*.

The *Euplexia pectinata* of Warren, which closely resembles *E. albovittata*, Moore, belongs to this genus.

Habryntis, *Led.*

H. v-brunneum, Grote, appears to me to be nothing more than a variety of *H. periculosa*, in which the central belt of the primaries is blacker.

Conservula, *Grote.*

Conservula, Grote, Bull. Buff. Soc., ii., p. 17 (1874).
Appana, Moore, Proc. Zool. Soc., 1881, p. 355.

Celæna, *Steph.*

I cannot see any reason for distinguishing *Hydrœcia* and *Helotropha* from this "genus." *Celæna* is very close to *Mamestra*, so much so that I find that *M. stricta* (= *cinnabarina*) and *M. olivacea* (which looks like a black form of the same thing) undoubtedly belong to *Celæna*, and are closely allied to *C. renigera;* on the other hand, *M. egens*, which I considered (Trans. Ent. Soc., 1889, p. 386, n. 7) to be identical with *M. stricta*, proves, upon a second examination by a better light, to be nearer to *M. strigilis:* Walker's type is much worn and rubbed, so that one might be excused for making it synonymous with almost any species of the same size; nevertheless, traces of the pattern can be seen with the help of a lens and bright sunlight.

Celæna appears to be a fairly natural group, but the structural distinctions between it and *Mamestra* are not apparent on the surface.

1. *Celæna renigera.*

Celæna renigera, Stephens, Ill. Brit. Haust., ii., p. 16 (1829).

C. herbimacula, Guenée, Noct., i., p. 223, n. 354 (1852).

♀, *C. infecta*, Walker, Lep. Het., x., p. 263, n. 9 (1856).

United States. Coll. B. M.

2. *Celæna leucostigma.*

Noctua leucostigma, Hübner, Samml. Eur. Schmett. Noct., pl. 80, fig. 375.

Var. *Cerastis lævis*, Butler, Trans. Ent. Soc., 1881, p. 181.

Europe, Japan, and China. Coll. B. M.

The type of *C. lævis* is an unusually large dark male, the markings upon which are ill-defined; there is, however, no question of its identity with this species. I can see no reason whatever for separating *C. leucostigma*, generically, from "*Mamestra*" *splendens* or "*Hydræcia*" *nictitans*.

NEPHELODES, *Guén.*

1. *Nephelodes minians.*

Nephelodes minians, Guenée, Noct., i., p. 130, n. 203 (1852).

Graphiphora expansa, Walker, Lep. Het., x., p. 399, n. 26 (1856).

United States. Coll. B. M.

Grote considers *N. violans* a variety of this species, and certainly there seems nothing beyond the greyer colour of the wings, due to the absence of red in the dark bands, upon which to separate it.

Var. *violans.*

Nephelodes violans, Guenée, Noct., i., p. 130, n. 204 (1852).

Graphiphora subdolens, Walker, Lep. Het., x., p. 405, n. 44 (1856).

United States. Coll. B. M.

"*Hadena*" *exornata*, Mœschl., seems to me to be a very closely allied species to the preceding.

Bellura, *Walker*.

Arzama, *Walk*.

1. *Bellura gortynoides*.

♀, *Bellura gortynoides*, Walker, Lep. Het., Suppl., ii., p. 465 (1865).

♂, *Arzama densa*, Walker, *l. c.*, p. 645 (1865).

♀, *A. vulnifica*, Grote (see Check List, p. 29, n. 584).

United States (Georgia). Coll. B. M.

2. *Bellura obliqua*.

Edema? obliqua, Walker, Lep. Het., Suppl., 2, p. 428 (1865).

Sphida obliquata, Grote (see Check List, p. 29, n. 582).

Canada; New York. Coll. B. M.

I fail to see a sufficient reason for distinguishing this species, generically, from the preceding.

Gortyna, *Ochs*.

Judging from the perfect insects only, this genus seems chiefly to differ from *Celæna* in the greater tendency of the species to become greasy, although many of the forms have a very distinct aspect, and are barely, if at all, separable from *Xanthia*; others, again (*G. illoba*, *necopina*, *micacea*, *stramentosa*, *petasitis*, and *nitela*), are extremely like *C. leucostigma* and allies. It is difficult to know what to do with groups of this kind, based, perhaps correctly, upon the mere clothing of the thorax, or some such apparently trivial character; they appear to be natural genera, and, therefore, I leave them as I find them.

1. *Gortyna illoba*.

Agrotis illoba, Butler, Ann. & Mag. Nat. Hist., ser. 5, vol. i., p. 162 (1878).

Graphiphora pacifica, Butler, *l. c.*, p. 165 (1878).

Japan. Coll. B. M.

The type of *A. illoba* is a very pale example from Hakodatè.

2. *Gortyna micacea.*

Noctua micacea, Esper, Eur. Schmett., pl. 145, fig. 6.
Hydræcia immanis, Guenée, Noct., i., p. 128, n. 201 (1852).
Apamea obliqua, Harvey (see Grote, Check List, p. 29, n. 560).

Europe, Japan, United States. Coll. B. M.

The Japanese and American examples are, as a rule, though not invariably, a little larger and darker than those from Europe.

Gortyna nebris, Guén., is considered by Grote to be a variety of *G. nitela:* this may be the case, although the latter resembles *G. petasitis*, and the former is more like *G. limpida;* but, if *Gortyna* is capable of so much variation, why is *G. harrisii* described as distinct from *G. rutila*, into which it grades almost insensibly (one of Grote's types agrees in all respects with that of M. Guenée, having whitish secondaries; whilst another is clearly the female of his *Ochria! sanzalitæ*, a very slight variety of *G. rutila*, not worth a name): the darkest examples, having brown secondaries, may, perhaps, stand as var. *harrisii*. The *G. rutila* of Grote's collection is not Guenée's species, but the female of *G. purpurifascia*, Grote.

XANTHIA, *Ochs.*

1. *Xanthia indirecta.*

Xanthia indirecta, Walker, Lep. Het., x., p. 468, n. 22 (1856).
Scopelosoma græfiana, Grote (see Check List, p. 32, n. 753).

United States. Coll. B. M.

Staudinger, in his Catalogue, regards the *Noctua fulvago* of Linneus' 'Fauna Suecica' as the *Xanthia cerago* of Schiffermüller; he is certainly wrong, for the Linnean description proves it, without question, to be the *Euperia fulvago* of Haworth. It is described as "somewhat glaucous and pale, with ferruginous bands across the primaries; secondaries paler; under surface of palpi and abdomen fulvous, of the wings pale yellow."

Ceramica, *Guén.**

1. *Ceramica picta.*

Mamestra picta, Harris (see Grote's Check List, p. 26, n. 343).

Ceramica exusta, Guenée, Noct., i., p. 344, n. 574 (1852).

Mythimna contraria, Walker, Lep Het., ix., p. 78, n. 10 (1856).

United States. Coll. B. M.

A specimen in the Zeller series is labelled, "*Hamulus*, Z. *Mamestra capucina splendens*, v. Müll." Whether either of these names is published, I do not know.

Fagitana, *Walk.*

1. *Fagitana littera.*

Leucania littera, Guenée, Noct. i., p. 71, n. 89 (1852).

Fagitana lucidata, Walker, Lep. Het., Suppl., 2, p. 645 (1865).

United States. Coll. B. M.

2. *Fagitana v-album.*

Ceramica v-album, Guenée, Noct., i., p. 345, n. 577 (1852).

Apamea purpuripennis, Grote (see Check List, p. 29, n. 555).

United States. Coll. B. M.

Pseudorthosia, *Grote.*

1. *Pseudorthosia vetusta.*

Mythimna vetusta, Walker, Lep. Het., ix., p. 78, n. 12 (1856).

Pseudorthosia variabilis, Grote (see Check List, p. 31, n. 706).

United States. Coll. B. M.

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* *C. ambusta* is more nearly allied to this genus than to *Cirrœdia*, the palpi being very short and horizontal. It should form the type of an allied genus; the subcostal furca of the secondaries is longer, and its footstalk consequently shorter; the hind tibial spurs also differ. It may be called *Brachycosmia*.

The so-called "*Hiptelia*" *miniago* is the European representative of this species, and belongs to the same genus.

ENARGIA, *Hübn.*

1. *Enargia decolor.*

Mythimna decolor, Walker, Lep. Het., xv., p. 1658 (1858).

Var. *Cosmia infumata*, Grote (see Check List, p. 32, n. 735).

United States. Coll. B. M.

BRACHYXANTHIA, *Butl.*

Gortyna inquæsita, Grote, belongs to this genus.

CIRRŒDIA, *Guén.*

C. xerampelina is the type: the structure of the palpi and entire pattern and coloration of *C. ambusta* are different, and will remove it from the neighbourhood of *C. xerampelina*.

CALYMNIA, *Hübn.*

The type of *Calymnia* is *C. trapezina:* the other species may be restored to their rightful genus, *Cosmia;* the latter name was erroneously applied by Lederer and Staudinger to a group of species, of which only two were included in *Cosmia* by Ochsenheimer (no type being indicated by him). M. Guenée distinctly indicated *C. affinis* as the type of *Cosmia*, and so it must remain.

PLASTENIS, *Boisd.*

1. *Plastenis retusa.*

Phalæna-Noctua retusa, Linneus, Faun. Suec., p. 321.
Cosmia curvata, Butler, Trans. Ent. Soc., 1886, p. 131.

Europe and Japan. Coll. B. M.

The Japanese specimens are slightly larger and darker than most European examples: when I named "*Cosmia curvata*," we had no European representative in the general collection. This was one of the many desiderata supplied by the Zeller collection.

Mesogona, *Boisd.*

1. *Mesogona tædata.*

♀, *Pseudoglæa tædata*, Grote (see Check List, p. 31, n. 709).

♂ ♂, *P. blanda* and *P. decepta*, Grote (*l. c.*, nn. 710, 11).

United States. Coll. B. M.

There are only three examples—none of them perfect, and two a good deal worn—to represent the three species upon which *Pseudoglæa* is based: as these three specimens vary less one from the other than our eight specimens of the nearly-allied *M. acetosellæ*, I have been reluctantly obliged to regard them as synonymous.

2. *Mesogona oxalina.*

Noctua oxalina, Hübner, Eur. Schmett. Noct., pl. 45, fig. 219.

Ipimorpha intexta, Harvey (see Grote's Check List, p. 32, note).

Europe and N. America. Coll. B. M.

Orthosia, *Ochs.*

Tæniocampa (part), Guén.

1. *Orthosia incerta.*

Noctua incerta, Hufnagel, Berl. Monats., iii., p. 298, n. 424 (1767).

Tæniocampa alia, Guenée, Noct., i., p. 352, n. 587 (1852).

Europe and United States. Coll. B. M.

This is the type of *Orthosia*, as restricted by Curtis.

Glæa, *Hübn.*

1. *Glæa vaccinii.*

Phalæna-Noctua vaccinii, Linnæus, Faun. Suec., p. 320.

Noctua spadicea (Schiff.), Hübn., fig. 179.

Var. *N. ligula*, Esper, Eur. Schmett., pl. 166, fig. 3.

Europe. Coll. B. M.

The describers of Exotic Lepidoptera frequently have to suffer from the bitter onslaught of men whose experience is limited to a study of the European and some-

times of the British fauna, these men complaining that the student of tropical forms makes too many species. As a matter of fact, no men are greater hair-splitters than purely European workers. The above is only one out of many instances in which one variable species has been laboriously sorted out into three. Formerly *N. ligula* was believed to be, in all probability, a variety of *N. spadicea*, Schiff.; but *N. vaccinii* was regarded as a very distinct species. In Walker's Catalogue (part x., p. 450) *N. ligula* stands as a recognised variety. Staudinger, on the other hand (Cat., pp. 118, 119), calls *spadicea* an aberration of *vaccinii*, but raises *ligula* to the rank of a species. Zeller, with his seventy specimens, showing every gradation between the three forms, was sadly bothered; so that he left a typical *N. ligula* amongst his examples of *G. vaccinii*, and divided the remainder somewhere in the middle, being evidently unable to find any constant character by which to distinguish them. Is it not a sense of their own shortcomings which makes the describers of European Lepidoptera so bitter against the students of exotic species?

Orrhodia, *Hübn.*

As regards the European species, I restrict this genus to *O. erythrocephala*, *vau-punctatum*, and *daubei*, the male antennæ in all of which are ornamented with series of little tuft-like ciliations. *O. signata*, French, *decliva*, Grote, *ardescens*, Butl., *punctosa*, Walk., and *viatica*, Grote, must also be referred to the same genus.

An example of *O. signata* was labelled "*Glæa anchocelioides*, Guén.," in the Grote collection; but the type of Guenée's species appears to me to be a female *Noctua* allied to *N. orbis*, Grote. Walker associated with it five other moths, representing three forms belonging to two different genera; of these the first three specimens were *Dyschorista cynica* and its variety *candens*, whilst the fourth and fifth were *Semiophora oriduca*.

1. *Orrhodia decliva.*

Orthosia decliva, Grote, on label (*Epiglæa*, in Check List, p. 32, n. 746).

Epiglæa deleta, Grote (*l. c.*, n. 747).

United States. Coll. B. M.

Beyond the fact that the type of *E. deleta* is rubbed and the fringes are wanting, which last fact gives a different outline to the wings, I cannot see how it is to be separated from *O. decliva*.

Epiglæa, *Grote*.

I believe *E. pastillicans*, Morr., to be a brightly coloured form of *E. tremula*, Harv.; the markings are identical in the two insects.

Ipimorpha, *Hübn*.

1. *Ipimorpha subtusa*.

Noctua subtusa, Schiff., Wien. Verz., p. 88, n. 17.
Ipimorpha pleonectusa and *subvexa*, Grote (see Check List, p. 32, nn. 716, 717).

Europe and United States. Coll. B. M.

The type of *I. subvexa* is larger, and has the outer line rather more incurved than in any of our other examples; but in both of these characters we have a gradation to the smallest of European specimens. In a series of six specimens taken by Grote in Renfrew Co., Canada, there is one example smaller than some of those from Europe. The ground colour of the wings is most inconstant, one of the six specimens above referred to being darker and greyer than the greyest European specimens, the latter being of the same tint as the type of *I. subvexa*. Grote himself says of the latter, "It is possible that the southern form is only a variety of *Pleonectusa*"; and I am satisfied that the latter is identical with *I. subtusa*.

Radinacra, *Butl*.

1. *Radinacra cinerascens*.

Cosmia cinerascens, Motschoulsky, Etudes, ix., p. 34 (1860).
Caradrina albosignata, var. *cæca*, Oberthür, Etudes, 5th livr., p. 74 (1880).

Japan. Coll. B. M.

Anchocelis, *Guén*.

Orthosia, Lederer & Staudinger.

Staudinger, strangely enough, regards *A. lunosa* as the type of *Anchocelis*: this is manifestly impossible, as

Guenée did not include the species in his genus when he described it. *A. litura* must be the type.

DYSCHORISTA, *Led.*

1. *Dyschorista cynica.*

Orthodes cynica, Guenée, Noct., i., p. 375, n. 627 (1852).
Var. *O. nimia*, Guenée, *l. c.*, p. 376, n. 628 (1852).
Var. *O. candens*, Guenée, *l. c.*, n. 629 (1852).
Orthosia tecta, Walker, Lep. Het., Suppl., 3, p. 714 (1865).

United States. Coll. B. M.

All the types of the above synonyms are in the Museum Collection, so that there can be no question about their identity as species.

2. *Dyschorista vecors.*

Orthodes vecors, Guenée, Noct., i., p. 376, n. 630 (1852).
O. enervis, Guenée, Noct., 3, p. 400 (1852).
O. griseocincta, Harvey (see Grote, Check List, p. 31, n. 660).

United States. Col. B. M.

There is no reason for adopting Guenée's unnecessary alteration of the name of this species.

3. *Dyschorista crenulata.*

Dyschorista crenulata, Butler, Ann. & Mag. Nat. Hist., ser. 6, vol. 6, p. 97 (1890).
Orthodes infirma (auct. nec Guenée).

United States. Coll. B. M.

As I have already pointed out, the *Orthodes infirma* of Guenée is a Brazilian species.

4. *Dyschorista curvirena.*

Orthodes curvirena, Guenée, Noct., i., p. 374, n. 625 (1852).
Orthosia spurcilinea, Walker, Lep. Het., xv., p. 1709 (1858).

Rio Janeiro and Venezuela. Coll. B. M.

This is such a characteristic common Brazilian species that it is impossible to mistake it for anything else.

Eremobia, *Steph.*

1. *Eremobia brevicornis.*

Xanthia brevicornis, Walker, Lep. Het., x., p. 466, n. 18 (1856).

Eremobia virescens, Butler, Ann. & Mag. Nat. Hist., ser. 5, vol. 4, p. 243 (1879).

Congo and Madagascar. Coll. B. M.

Walker's type is so very much rubbed that, being placed far away from its natural position, it was easily overlooked; sufficient traces of the pattern still remain upon the primaries to render identification certain.

Perigea, *Guén.*

1. *Perigea apameoides.*

Perigea apameoides (part), Guenée, Noct., i., p. 229, n. 367 (1852).

P. ? indecisa, Walker, Lep. Het., xi., p. 733 (1857).

P. otiosa, Walker, *l. c.*, xv., p. 1693 (1858).

P. paupera, Walker, *l. c.* (1858).

Xylina detrecta, Walker, *l. c.*, Suppl., 3, p. 750 (1856).

Perigea fabrefacta, Morrison (see Grote's Check List, p. 28, n. 480).

North and South America. Coll. B. M.

This may prove to grade into the following species:—

2. *Perigea conducta.*

Perigea apameoides (part), Guenée, Noct., i., p. 229, n. 367 (1852).

Caradrina conducta, Walker, Lep. Het., x., p. 296, n. 32 (1856).

Perigea centralis, Walker, *l. c.*, xi., p. 734 (1857).

Celæna serva. Walker, *l. c.*, xv., p. 1689 (1858).

Hadena pauperata, Walker, *l. c.*, p. 1727 (1858).

Perigea inexacta, Walker, *l. c.*, Suppl., 2, p. 682 (1865).

P. canorufa, Walker, *l. c.*, p. 683 (1865).

P. illecta, Walker, *l. c.*, p. 684 (1865).

Hadena leonina, Walker, *l. c.*, 3, p. 735 (1865).

H. spargens, Walker, *l c.*, p. 739 (1865).

H. conducta, Walker, *l. c.*, p. 740 (1865).

Asia, Africa, and Australasia. Coll. B. M.

Guenée included both species under his *P. apameoides*; the description was evidently taken from an American example, but he noted a specimen as belonging to the East India Company, which he could not believe to be Indian. The specimen in question still retains Guenée's label: it is a *P. conducta* from Java.

3. *Perigea vecors.*

Perigea vecors, Guenée, Noct., i., p. 230, n. 371 (1852).
Apamea remissa, Walker, Lep. Het., xi., p. 729 (1857).
Mamestra demittens, Walker, *l. c.*, xv., p. 1684 (1858).

North and South America. Coll. B. M.

Guenée's type is a damaged headless specimen. This species is also identical with *P. luxa*, Grote.

4. *Perigea punctifera.*

Celæna punctifera, Walker, Lep. Het., x., p. 263, n. 8 (1856).
♀, *C. semifusca* (as ♂), Walker, *l. c.*, xi., p. 732 (1857).

United States, St. Domingo, and Jamaica. Coll. B. M.

5. *Perigea concisa.*

Laphygma concisa, Walker, Lep. Het., ix., p. 191, n. 10 (1856).
Perigea imbella, Walker, *l.c.*, xv., p. 1692 (1858).

St. Domingo. Coll. B. M.

6. *Perigea dolorosa.*

Mamestra dolorosa, Walker, Lep. Het., Suppl., 2, p. 667 (1865).
Hadena taprobanæ, Felder, Reise der Nov. Lep., 4, pl. cx., fig. 3.

Ceylon and Figi. Coll. B. M.

Felder's figure is much under-coloured: the primaries are very black, and the external border of the secondaries dark. The species approaches *P. albomaculata*, Moore, being intermediate between it and *P. conducta*.

7. *Perigea subornata.*

Perigea subornata, Walker, Lep. Het., Suppl., 2, p. 682 (1865).
Ochria niveopicta, Butler, Proc. Zool. Soc., 1878, p. 485, n. 78.

Jamaica. Coll. B. M.

Walker's type is a broken specimen without locality.

8. *Perigea decens.*

Perigea decens, Walker, Lep. Het., x., p. 276, n. 23 (1856).
Celæna prolifera, Walker, *l. c.*, xi., p. 732 (1857).
Perigea punctosa, Walker, *l. c.*, p. 734 (1857).
Apamea intermittens, Walker, *l. c.*, xv., p. 1686 (1858).

St. Domingo. Coll. B. M.

9. *Perigea albigera.*

Perigea albigera, Guenée, Noct., i., p. 228, n. 364 (1852).
Hadena abida, Felder, Reise der Nov. Lep., 4, pl. cix., fig. 7.

Rio Janeiro. Coll. B. M.

10. *Perigea tepens.*

Celæna tepens, Walker, Lep. Het., x., p. 266, n. 17 (1856).
Perigea nigripalpis, Walker, *l. c.*, p. 277, n. 25 (1856).

Venezuela. Coll. B. M.

11. *Perigea mobilis.*

Perigea mobilis, Walker, Lep. Het., x., p. 277, n. 24 (1856).
Celæna inclinata, Walker, *l. c.*, xi., p. 732 (1857).
Perigea subaurata, Walker, *l. c.*, Suppl., 2, p. 681 (1865).

St. Domingo, Honduras, Brazil. Coll. B. M.

Perigea albinasus, Walker, is a rubbed example of *Agrotis ignobilis*, Walk.; *Hadena albipalpis*, Walk., is

the same species: these may therefore be added to the synonymy of *A. ignobilis*.

P. niveirena is not a *Perigea;* it would be better placed in *Homohadena*.

CONDICA, *Walk.*

This is only a distinctly marked group of *Perigea*.

1. *Condica cupentia.*

Noctua cupentia, Cramer, Pap. Exot., iii., pl. cclii., fig. E (1782).

Condica palpalis, Walker, Lep. Het., ix., p. 240, n. 1 (1856).

N. America, St. Domingo, Jamaica. Coll. B. M.

Var. *C. epopea.*

Noctua epopea, Cramer, Pap. Exot., iii., pl. cclxxii., figs. G, H (1782).

"*Hadena*" *confederata*, Grote, on label (see Check List, p. 28, n. 478).

United States. Coll. B. M.

Var. *C. infelix.*

Perigea infelix, Guenée, Noct., i., p. 229, n. 368 (1852).

N. America and Callao. Coll. B. M.

Of the above three fairly well-defined forms of a very variable species, *C. cupentia* has the primaries silvery whitish, with dark brown markings; *C. epopea* has the silvery colouring stained with orange ferruginous, and *C. infelix* has the primaries suffused with brown.

AMYNA, *Guenée.*

1. *Amyna selenampha.*

Amyna selenampha, Guenée, Noct., i., p. 406, n. 378 (1852).

Var. *Alamis spoliata*, Walker, Lep. Het., xiii., p. 1050 n. 11 (1857).

Hadena latipennis, Walker, *l. c.*, Suppl., 3, p. 738 (1865).

Asia, Africa, and Australasia. Coll. B. M.

The variety twice named by Walker belongs to the

form without a white stigma: an example of the same form from Java was labelled by Guenée with a MS. name, but he evidently came to the conclusion afterwards that it was no more than a variety, and therefore refrained from publishing it.

Ilattia, *Walk.*

Amyna (part), Guenée.
Stridova, Walker.
Chytoryza, Grote.

1. *Ilattia octo.*

Perigea octo, Guenée, Noct., i., p. 233, n. 377 (1852).
Poaphila stricta, Walker, Lep. Het., xiv., p. 1476, n. 21 (1857).
Ilattia cephusalis, Walker, *l. c.*, xvi., p. 209 (1858).
Amyna undulifascia, Butler, Ann. & Mag. Nat. Hist., ser. 4, vol. xvi., p. 403 (1875).
Ilattia apicalis, Moore, Descr. Ind. Lep., Atk., ii., p. 112 (1882).
Perigea supplex, Swinhoe, Proc. Zool. Soc., 1885, p. 452.

Var. *axis.*

Amyna axis, Guenée, Noct., i., p. 407, n. 378, *b* (1852).
Celæna flavigutta, Walker, Lep. Het., xv., p. 1688 (1858).
C.? perfundens, Walker, *l. c.*, p. 1691 (1858).
Miana inornata, Walker, *l. c.*, Suppl., 2, p. 677 (1865).
Erastria stigmatula, Snellen, Tijd. voor Ent., 15th Jahrg., p. 55, n. 44, pl. 4, fig. 14 (1872).
Stridova albigutta, Walker, Trans. Nat. Hist. Soc. Glasgow, i., p. 35, n. 41 (1873).
Amyna stellata, Butler, Ann. & Mag. Nat. Hist., ser. 5, vol. i., p. 162 (1878).
Chytoryza tecta, Grote (see Check List, p. 33, n. 811).

Asia, Africa, America, and Australasia. Coll. B. M.

It is quite impossible, with so large a series as we possess, to separate any of the numerous synonyms associated above; many of the descriptions were based upon single examples from widely distant localities; Guenée described his species from specimens received from Tahiti; we have examples from the Ellice, Gilbert and Marquesas Islands, the New Hebrides, Tonga, Fiji,

and Rockhampton, answering to both his descriptions: they are, as a rule, a little smaller than the majority of Indian examples, but one specimen from the New Hebrides is as large as the largest Indian specimens representing *I. apicalis*. *Perigea supplex* is like examples from Marquesas. Grote's *Chytoryza* agrees exactly with Solomon Island specimens.

It is quite possible that *I. cuprcipennis* may be only a form of *I. octo*, but the figures of this and *I. cerrina* are so unsatisfactory that they hinder rather than assist the identification of the species; figures of closely allied species with complicated markings need to be extremely carefully executed to be of the slightest use.

Mr. Tutt has called attention to an error in my previous paper, probably due to my being interrupted by some visitor whilst in the act of copying the synonymy from my rough notes. *Agrotis saucia* is not a synonym of *A. ypsilon:* therefore, the name "*ypsilon*" should be erased from the page and *A. saucia* substituted. As is well known, *A. suffusa* is the synonym of *A. ypsilon:* the error was purely a *lapsus calami*, as it did not extend to the arranged collection. In the other supposed mistakes, it is Mr. Tutt who is in error.

THE

PROCEEDINGS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON

FOR THE YEAR 1890.

February 5, 1890.

The Rt. Hon. LORD WALSINGHAM, M.A., F.R.S., President, in the chair.

Donations to the Library were announced, and thanks voted to the respective donors.

Nomination of Vice-Presidents.

The President announced that he had nominated Mr. Joseph W. Dunning, M.A., F.L.S., Mr. Henry J. Elwes, F.L.S., and Mr. Frederick DuCane Godman, M.A., F.R.S., Vice-Presidents for the Session 1890—1891.

Election of Fellows.

Mr. B. A. Bristowe, of Champion Hill, S.E.; Mr. J. E. Eastwood, of Witley, Surrey; Mr. Albert B. Farn, of Stone, Greenhithe, Kent; and Mr. O. Goldthwaite, of Leyton, Essex, were elected Fellows.

Exhibitions, &c.

Mr. F. D. Godman exhibited a specimen of *Papilio thoas*, from Alamos, in the state of Gonora, Mexico, showing an aberration in the left hind wing. He pointed out that the subcostal nervure bifurcated a little beyond the cell, thus sending an extra branch to the outer margin. The effect upon the coloration was as follows:—the transverse discal band on the upper surface showed seven instead of six ochreous spots, and there was an extra lunule on the outer margin. On the under side the extra spots were also shown; in addition to this there was another glaucous lunule in the dark discal band. The right side of the insect appeared to be perfectly normal.

Mr. Roland Trimen observed that butterflies of the genus *Papilio* were seldom liable to variation.

Mr. Charles G. Barrett exhibited a series of specimens of *Phycis subornatella*, Dup., from Pembroke, the east and west of Ireland, the Isle of Man, and Perthshire; and a series of *Phycis adornatella*, Tr., from Box Hill, Folkestone, Norfolk, and Reading; also a number of forms intermediate between the above, taken in the Isle of Portland by Mr. N. M. Richardson. He said that these forms proved the identity of the two supposed species, which he believed were both referable to *P. dilutella*, Hb. He also exhibited specimens of *Hesperia lineola*, and a pale variety of it taken in Cambridgeshire by Mr. H. W. Vivian; specimens of *Epischnia bankesiella*, a recently-described species, taken by Mr. N. M. Richardson in Portland; and a specimen of *Retinia margarotana*, H.-S., a species new to Britain, discovered in Mr. Hodgkinson's collection amongst a number of *Retinia pinivorana* which had been collected in Scotland.

Mr. W. H. B. Fletcher showed a series of *Gelechia fumatella* from sandhills in Hayling Island and near Littlehampton, and, for comparison, a series of *G. distinctella*, from the same places. He also showed a few bred specimens of *G. terrella*, and a series of preserved larvæ. He stated that on the downs the larvæ live in the middle of the tufts of such grasses as *Festuca ovina* and allied species, and that on sandhills, where herbage is more sparse, they make silken galleries

under stones, and sally forth to eat blades of grass growing near their homes.

Papers &c., read.

Mr. H. Goss read a communication from Dr. Clemow, of Cronstadt, St. Petersburg, on the subject of the coincidence of vast flights and blights of insects during the years 1510, 1757, 1763, 1782, 1783, 1836 and 1847, and the epidemic of influenza. During the year 1889 no unusual activity in the insect world had been recorded.

Mr. H. T. Stainton and Mr. M'Lachlan made some remarks on the subject, the purport of which was that there was no connection between epidemics and the occurrence of swarms of insects; and this appeared to be the opinion of the meeting.

Mr. G. A. J. Rothney communicated the following "Notes on Flowers avoided by Bees." :—

"With reference to Mr. J. W. Slater's note, read at the meeting of the Society on April 2nd, 1879, on certain flowers being avoided by bees, and mentioning particularly the dahlia, passion-flower and oleander, I described in a letter read at the meeting on April 7th, 1880, how exceptionally attractive I had found the dahlias, which grow so luxuriantly on the Mussoorie Hills (India), to bees, wasps, and indeed Hymenoptera generally. From 1880 to 1886 I made a practice of watching the blossoms of the passion-flower and oleander, and as both these plants grew strongly in my own compound in Barrackpore (Bengal), I had ample opportunity for making the following observations, which in a great measure agree with Mr. Slater's note—

Passion-flower.—This is a great favourite with various species of *Xylocopa*, and numbers of these handsome bees can generally be seen booming from flower to flower, with their strong heavy flight and deep hum. I have taken *Xylocopa latipes*, *tenuiscapa*, *fenestrata*, *auripennis*, and the female of *æstuans* (the male of *æstuans* I have only taken circling round and round the tops of the China-box, or high up in the foliage of the Peepul-tree, but never resting for a second). I

have never seen any other bees visiting the passion-flower, so that it would seem that only a powerful insect like *Xylocopa* can appreciate its sweets.

Oleander.—With one solitary exception I have never seen any insect of any kind visiting the flowers of this shrub; while other plants in the compound would be gay with butterflies, bees, and insect-life generally, the fine clusters of the oleander always remained entirely neglected. The one exception occurred on July 13th, 1883, when I noticed a large black *Xylocopa* settle on a cluster of white flowers, remain for a few seconds, and then fly away."

Mr. Slater, Colonel Swinhoe, Mr. Trimen, Lord Walsingham, and Mr. M'Lachlan took part in the discussion which ensued.

Dr. D. Sharp read a paper entitled "On the structure of the Terminal Segment in some male Hemiptera."

Colonel Swinhoe read a paper entitled "On the Moths of Burma," which contained descriptions of several new genera and 107 new species.

Dr. F. A. Dixey read a paper entitled "On the Phylogenetic Significance of the wing-markings in certain genera of the *Nymphalidæ*." The author said he believed that the various markings of members of the genera *Vanessa*, *Pyrameis*, *Grapta*, *Araschnia*, &c., were modifications of a single type, seen in its simplest form in the genus *Argynnis*, where it consists essentially of four series of dark spots on a light ground colour, running more or less parallel to the hind border of both pairs of wings. The passage of the generalised Argynnid type of marking to the specialised condition which obtains in the highly ornamental Vanessids is illustrated by several forms, and especially by the female of *A. niphe*, where the survival of what is probably the ancestral dark ground colour in some places, and the picking out of certain areas in pure white in others, produces a resemblance to *Pyrameis* which affects not only the general aspect, but extends even to several small details; and this although the characteristic Argynnid markings still preserve their relative size and position. The oldest Argynnid pattern now extant is probably that exhibited by the female of *A. diana*, in which the characteristic series of spots have scarcely yet

fully emerged from the general dark-blue colour of the wing. The tendency towards a deeper coloration, shown by many female Argynnids, appears to be due to the retention of an old, and not to the acquisition of a new, feature. The successive modifications undergone by the dark spots and the intervening patches of ground-colour, were traced in detail by the help of diagrams, which also exhibited a system of letters and numbers devised by Dr. Dixey for the ready identification of the markings.

Lord Walsingham said that the lucid manner in which Dr. Dixey had defined the series and groups of markings and the direction in which modifications are found to occur must be of great use in separating true species from mere local varieties; and that it might be worthy of notice as corroborative evidence that the darker forms are probably the more ancestral and therefore the more glacial, that *Vanessa* hybernates with folded wings, catching the first rays of warmth on its dark under side, whereas the modified *Argynnis* does not withstand the winter. Lord Walsingham also complimented Dr. Dixey on his excellent drawings and diagrams.

Mr. Jenner Weir observed that Dr. Dixey's philosophical paper had given him the greatest pleasure, and he was very glad to find that the author attached so much importance to the nearly obsolete markings of some of the species dealt with as illustrating their phylogeny, such as the minute blue spot below the ocellus in the under wing of *Vanessa io*, and the small white spot in the red band of the upper wing, in the female only, of *Pyrameis atalanta*; and he observed that Mr. Scudder, in his late work on 'The Butterflies of the Eastern United States,' had not mentioned this mark in his very carefully worded descriptions, and that he had written to him on the subject, to which he replied that he had never observed it in New England specimens. Mr. Weir further said that he thought that the markings on the wings of *Apatura iris* had a different phylogenetic origin to those of the Argynnidi and Vanessidi; and he also stated that Dr. Dixey's paper threw considerable light on the mode in which the female of *Acidalia niphe* had become a mimic of *Limnas chrysippus*.

Mr. H. J. Elwes said that he had listened with much interest to Dr. Dixey's paper, because he had recently been engaged on a review of the genus *Argynnis*, which had been largely referred to; and as he had been able to find no good characters by which that large genus could be divided, he should have been glad to make use of anything suggested by Dr. Dixey. But as the species to which he had mainly referred were species which he looked upon as aberrant in the genus, as regards their coloration and distribution, he did not see his way to utilise those observations at present. He thought that the exact definition of the areas in the wings in which a certain type of markings were found in any group of Lepidoptera, as had been done by Dr. Dixey, would be of importance in studying their affinities, because in genera in which the same sort of markings or ocelli were common to many species, the position of those markings or ocelli was of much more importance for purposes of specific distinction than their degree of size or colour. In *Parnassius*, and in many genera of *Satyridæ*, the number and size of the ocelli was very variable, whereas their position was almost invariable, and in other genera in which bands or stripes were the prevalent type of markings, the length, breadth, and distinctness of the bands was much more variable than their position and direction. He thought, however, that in attempting to follow out such a line of investigation as had been pursued by Dr. Dixey, we ran the risk of becoming lost in a maze of unprofitable speculation upon points about which we could at present come to no certain conclusion; and though he recognised to the fullest extent the value of such investigations, when pursued by those whose previous stores of knowledge and industry of research fitted them for the difficulties which they would encounter at every turn, yet he believed that only one man, perhaps, in a million was gifted with the mental abilities which would enable him to use that knowledge in the way in which Darwin had done. And he thought that the want of accurate and complete observation and definition of genera and species, in this branch of entomology, was still so great that most of us would do more useful work by trying to increase that knowledge for the benefit of future

Darwins, rather than by trying to explain facts which, in the absence of such knowledge, seemed to him inexplicable.

March 5, 1890.

Henry J. Elwes, Esq., F.L.S., F.Z.S., Vice-President, in in the chair.

Donations to the Library were announced, and thanks voted to the respective Donors.

Election of Fellows.

Mr. G. H. Kenrick, of Whetstone, Somerset Road, Edgbaston, Birmingham; and the Rt. Hon. Lord Rendlesham, of Rendlesham Hall, Woodbridge, Suffolk, were elected Fellows.

Exhibitions, &c.

Mr. C. G. Barrett exhibited a number of specimens of *Dianthecia carpophaga*, Bork., bred by Mr. W. F. H. Blandford from larvæ collected near Tenby, Pembrokeshire, on flowers of *Silene maritima*. He remarked that the series included a number of forms intermediate between *D. carpophaga* and *D. capsophila*, and established the fact that the latter is only a local variety of the former.

Mr. W. H. B. Fletcher, Mr. Blandford, Mr. M'Lachlan, and the chairman took part in a discussion as to the identity of the supposed species.

Mr. Barrett further exhibited a specimen of *Dianthecia luteago* var. *Barrettii*, Db., also bred by Mr. Blandford from a larva found at Tenby, and he remarked that *Barrettii* had not previously been taken in England; also a long series of forms intermediate between *Catoptria scopoliana*, Hw., and its small variety *parvulana* Wilk., collected by Mr. E. Bankes, Mr. Fletcher, Mr. Vine, and others, in Sussex, the Isle of Wight, and Pembrokeshire; also a specimen of *Botys mutualis*, Zell.,—a species widely distributed in Asia and Africa,—taken by Mr. C. S. Gregson near Bolton, Lancashire.

Mr. A. F. Griffith exhibited two specimens of *Myelois pryerella*, male and female, taken in the London Docks in the autumn of 1888; also a series of *M. ceratoniæ*, kindly lent by Mr. B. A. Bower for comparison, shewing the former species to be not only much paler and without the discoidal spots on the fore wing, but also much shorter and broader in the fore wing. He also exhibited two *Penthina grevillana* taken in Sutherlandshire, with a row of *P. prælongana* from the same locality, and also a row of *P. sauciana* var. *Staintoniana* kindly lent by Mr. Bower for comparison; the *grevillana* appearing to be intermediate between the other two species, approximating to *prælongana* in the shape of the wings, and to *sauciana* in the markings. He said that he had not met with the latter species in Sutherland. Mr. Griffith further exhibited a row of a species of *Peronea* bred from larvæ taken by himself on *Myrica gale* and bilberry in Sutherland, in 1889, approximating to *comparana*, *perplexana* and *comariana*; six specimens of *Symmoca signatella* taken in the London Docks among cork (both the genus and the species having now been for the first time detected in Britain); three specimens of a species of *Ephestia* apparently allied to *ficella* and *kühniella*, taken by the exhibitor in the London Docks in 1888, and apparently new to Britain; also a nondescript specimen taken at Tan y Grisiau in North Wales, in August, 1886, at rest on a slate fence. He pointed out that the specimen was a female, partaking of the appearance of a *Chilo*, and said that Mr. W. Warren had promised to examine it. Mr. Griffith also exhibited three specimens of the form of *Exapate* found among fir and named *duratella*, together with a pair of ordinary *gelatella* bred from larvæ taken on *M. gale*, in Sutherland. He remarked that though these latter are darker than our southern forms, the specimens from fir are of a very distinctly unicolorous appearance, and dusky brownish, instead of warm grey. The three specimens exhibited were taken in a fir-wood near Aberdeen, by Mr. A. Horne, in November, 1884. He further exhibited one specimen of *Incurvaria tenuicornis* and four *Nemophora pilella*, taken in Sutherland, and the three original specimens of *Ornix fagivora*, bred from larvæ found near Cambridge; also specimens (two from

Sutherland, and five from Abbots Wood, Sussex), of a form apparently allied to, but distinct from, *Tinea rusticella*, with specimens of the latter from Sutherland and Brighton for comparison. He observed that in this form the fore wings are shorter and broader, the black more intense and shining, and the yellow very brilliant; and that there is a large clear yellow patch beyond the middle of the hind margin of the fore wings which is wanting in *rusticella*. He also exhibited two specimens of a pretty unicolorous variety of *Hypermecia angustana*, taken at Horning in 1888.

Mr. H. Goss exhibited several abnormal specimens of *Chelonia caja*, bred last December, from eggs given him in August by Mr. Sydney Webb, of Dover. The object of the exhibition was to show the effects produced by forcing the larvæ, and subjecting them to unusual conditions. It was stated that the peculiarity of the colour of the hind wings of the female parent had not been transmitted to any of the offspring.

Mr. Blandford referred to two specimens of a species of *Cardiophorus*, from Tenby, which he had exhibited at the August meeting of the Society as *Cardiophorus cinereus*, and stated that subsequent investigation had led him to hand them to Mr. Champion for determination. Mr. Champion was of opinion that they did not belong to the same species; that one of them was *Cardiophorus asellus*, Er., and the other, probably, *C. equiseti*, Hbst., a species new to this country.

Papers read.

Mr. C. J. Gahan read a paper entitled "New Longicornia from Africa and Madagascar."

Mr. Elwes read a paper entitled "On a new species of *Thymara* and other species allied to *Himantopterus fuscinervis*, Wesmael."

Dr. Sharp read a paper entitled "On some Aquatic Coleoptera from Ceylon."

Mr. J. J. Walker, R.N., communicated a paper entitled "Notes on the Lepidoptera from the Region of the Straits of Gibraltar."

Mr. F. Merrifield, Mr. B. G. Nevinson, Mr. Elwes, and Mr. G. Lewis took part in the discussion which ensued.

April 2, 1890.

Frederick DuCane Godman, Esq., M.A., F.R.S., Vice-President, in the chair.

Donations to the Library were announced and thanks voted to the respective donors.

Election of Fellows.

Mr. George Bryant, of 6, Oakley Crescent, Chelsea, S.W.; Mr. A. E. Hall, of Norbury, Pitts Moor, Sheffield; Mr. J. J. F. X. King, of 207, Sauchiehall Street, Glasgow; Mr. H. C. Oakshott, of De Beauvoir House, Falmouth; Mr. A. E. Stearns, of the Lodge, Upper Halliford, Walton-on-Thames; and Mr. George Vigers, of Hersham, Surrey, were elected Fellows.

Death of a Fellow.

Mr. Godman announced the death of Mr. Joseph S. Baly, of Warwick, who had been a member of the Society since 1850.

Exhibitions, &c.

Dr. Sharp exhibited a female specimen of a coleopterous insect, *Temnochila quadricollis*, Reitt., which was the subject of a very unusual malformation. Dr. Sharp said that the malformation was of the nature termed "ectromélie" by Lacordaire; this form of malformation, *viz.*, by deficiency of some part, is rare, but occurs occasionally in parts of the extremities. In the specimen exhibited by Dr. Sharp, the part wanting was the prosternum between and behind the middle coxæ. With this exception the structure of the individual appeared to be normal, and even the malformation was symmetrical.

Mr. R. W. Lloyd exhibited three specimens of *Elater pomonæ*, taken about the middle of March last, at Brockenhurst, in the New Forest.

Colonel Swinhoe exhibited and read notes on certain species of the genus *Euthalia*.

Mr. T. R. Billups exhibited male and female specimens of *Cecidomyia salicis-siliqua*, Walsh, which had just emerged from

galls received from Mr. Cockerell, who had collected them on a species of sallow in Colorado. He also exhibited three species of *Ichneumonidæ* new to Britain, viz., *Ichneumon Haglundi*, Holmg, bred by Messrs. Adkin and Barker from *Arctia fuliginosa; Phygadeuon rufo-niger*, Bridg., taken at Ashdown Forest in November, 1885 ; and *Phygadeuon sodalis*, Tasch., taken at Dulwich in June, 1889. He said that two of these species had been described by Mr. Bridgman, in Part IV. of the ' Transactions of the Entomological Society ' for 1889.

Mr. C. G. Barrett exhibited specimens of *Bryotropha obscurella*, Hein., received from Darlington, and the neighbourhood of Windermere. He also exhibited specimens of *Doryphora elongella*, Hein., from Pembroke, and remarked that both species were new to the British list.

Papers, &c., read.

Colonel Swinhoe read the following "Notes on certain species of the genus *Euthalia*":—"In 1859 Mr. Moore described a female of the genus *Euthalia* as *Adolias sedeva* in Trans. Ent. Soc. Lond. p. 68, pl. 4, f. 3; and in 1865 he described a male *Euthalia* as *Adolias balarama* in P. Z. S., 1865, p. 766, pl. 41, f. 3. Mr. de Niceville, in his ' Butterflies of India,' vol. ii. p. 207, puts *E. sedeva* as a female variety of *E. appiades* of Ménétrie's ; in p. 208 he enters *E. balarama* as a separate species doubtfully, and remarks as follows:—' The female of *E. balarama*, should it ever be discovered, is almost certain to have the outer discal band on both wings straight. My knowledge of *E. balarama* is confined to what has been published regarding it, but I have a suspicion that it is a "sport" only of *E. appiades*. Mr. Moore believes *E. balarama* to be a good species of which his *E. sedeva* is the female, but I cannot agree with him; *E. sedeva* is inseparable from the normal form of *E. appiades* female, in which the white spots are obsolete.'

About two years ago the Indian Museum, Calcutta, gave me a quantity of old duplicates in paper envelopes, collected in several localities, and only quite recently have I been able to get the opportunity of having them relaxed and pinned out. Though most of them are old and worn, and

many of them mite-eaten, yet being from good localities I determined to go through them all, and the result has well paid me for the trouble. Amongst the duplicates from Buxar I found a number of butterflies of the genus *Euthalia*, which looked when in the envelopes like males and females of *E. appiades*, a common insect in Buxar, but as they did not correspond with the Buxar specimens in my collection I had them all set up, and find I have a nice series of *E. balarama* male and *E. sedeva* female. I have brought for exhibition to this meeting six of the males and three females (the others I have given to Mr. Moore); also seven males and six females of *E. appiades* (two males and one female from Buxar, and the rest from Sikkim). I have also made rough enlarged drawings of both species. I think, after examining these specimens, no one can for a moment doubt that *E. sedeva* and *E. balarava* are sexes of one and the same species, and that though closely allied to, it is quite distinct from *E. appiades*.

Above the specimens of *E. balarama* from Buxar I have placed a broken specimen of that species, received from Mr. Moore, labelled 'Silhet.' This is a co-type, and it will be seen that all the Buxar specimens are identical with it. The type of *E. sedeva* is a unique specimen in Mr. Moore's collection: it is very well represented in his plate, and my specimens are identical with it. The chief character in *E. sedeva* is the large white subapical patch on the fore wings, on the borders of which the double discal band expands, after being very much contracted around a small white spot in the lower radial interspace; this character is constant in all the male examples of *E. balarama*, and although the patch is not white it is there, and can be distinctly seen both on the upper and under sides, whereas in *E. appiades* the outer band is straight and the inner one only slightly bent in the lower radial interspaces; there are also differences in coloration below, but they are not of so much consequence."

Dr. Thallwitz, of Dresden, communicated the following "Notes on some species of the genus *Hilipus*":—"Mr. Pascoe described, at p. 577 et sq. of the 'Transactions' of the Ent. Soc. London, 1889, a series of new species of the genus *Hilipus*, from South America, and some among them appear to be

identical with species described by Th. Kirsch, in a paper on South American beetles, which was ready for printing at the time of his sudden death in July, 1889, and which has since been printed under my supervision, during the last months of the past year, as the 4th memoir of the 'Abhandlungen und Bericht Konigl. Zoologischen und Anthropologisch-Ethnographischen Museums zu Dresden, 1888–89.' It has not yet been published, as 4 coloured plates, with figures of about 100 new species, are still in the hands of the artist; but it will be issued in about a fortnight. I beg to notice here that Th. Kirsch described and figured as *Hilipus anchoralis* (pl. iii. fig. 55), a species which evidently is identical with *H. fimbriatus*, Pascoe (pl. xvii. fig. 1) which latter name will, of course, stand. Closely related, but not identical, appear to be *Hilipus inca*, Kirsch., and *H. angusticollis*, Pascoe. No doubt very nearly allied to one another are *Hilipus scutellatus*, Kirsch., and *H. phrynoides*, Pascoe."

Mr. E. Meyrick read a paper entitled "The Classification of the *Pyralidina* of the European Fauna." Mr. W. F. Kirby, Mr. M'Lachlan, Mr. Stainton, Mr. Elwes, and Mr. Barrett, took part in the discussion which ensued.

Prof. Westwood contributed a paper entitled "Notes on certain species of *Cetoniidæ* of the Section *Goliathides*."

Mynheer P. C. T. Snellen, of Rotterdam, communicated a paper entitled "A Catalogue of the *Pyralidina* of Sikkim, collected by H. J. Elwes, and the late Otto Möller," and Mr. Elwes read some "supplementary notes" on the last-named paper by way of an appendix. A discussion followed, in which Mr. Distant, Colonel Swinhoe, Mr. M'Lachlan, and Mr. M. Jacoby took part.

May 7, 1890.

Henry J. Elwes, Esq., F.L.S., F.Z.S., Vice President, in the chair.

Donations to the Library were announced, and thanks voted to the respective Donors.

Election of Fellows.

Mr. W. G. Blatch, of 214, Green Lane, Small Heath, Birmingham; Mr. F. J. S. Chatterton, of 132, Queen Victoria Street, E.C.; Mr. Charles Fenn, of Burnt Ash Hill, Lee, S.E.; and Mr. George B. Routledge, of 50, Russell Square, W.C., were elected Fellows.

Exhibitions, &c.

Dr. D. Sharp exhibited specimens of a beetle of the family *Bruchidæ* (*Caryoborus lacerdæ*), and the nuts resembling small cocoa-nuts from which they had been reared, and stated that three of these nuts had been sent him from Bahia, by the late Senor Lacerda, about six years ago, and one of the beetles had in part effected its exit from the nut during the voyage; a second beetle had recently emerged after the nuts had been in this country for five years; the exact date of appearance had not been noticed, but Dr. Sharp had little doubt it was during the warm weather of 1889. The example in the third nut had been interfered with when received, but had undergone its metamorphosis and had died within its nut. Dr. Sharp added that the facts left little doubt that the means of exit for the perfect insect were provided by the larva boring a hole through the very hard nutshell, which hole was not, however, visible externally, as it was not carried quite to the surface, but left the outer skin intact. Dr. Sharp also exhibited several specimens of Diptera collected by Mr. Herbert Smith in St. Vincent, and read a letter from him to Mr. Godman on the subject of the vast number of species of this order which he had recently collected in that island. Mr. M'Lachlan, Dr. Mason, Mr. Waterhouse, and Mr. Elwes took part in the discussion which ensued.

Mr. R. T. Lewis, F.R.M.S., on behalf of Mr. W. M. Maskell, of Wellington, New Zealand, exhibited a collection of *Coccidæ* from that Colony, in explanation of which the following extracts were read, from a letter addressed by Mr. Maskell to Mr. Lewis, and dated "Wellington, New Zealand, February 16th, 1890:—

"I am going to ask that, if not giving too much trouble,

you or Mr. Douglas would some evening exhibit these insects on my behalf at the Entomological Society. I believe scarcely anybody in England has seen our New Zealand Coccids; and although this lot is not a complete set, it contains some very representative, and some very curious, species. I regret very much that I cannot bring home my whole cabinet.

"These now sent comprise 25 species of Coccids, 2 Psyllids, and 3 Aleurodids, forming a fairly representative lot of some of our most curious Homoptera.

"The following, amongst them, are described and figured in my book, 'On the Scale Insects of New Zealand' (Wellington, 1887):—*Poliaspis media*, *Ctenochiton depressus*, *C. flavus*, *C. viridis*, *Fiorina asteliæ*, *Inglisia patella*, *I. leptospermi*, *Eriochiton spinosus*, *Eriococcus pallidus*, *Dactylopius poæ*, and *Celestoma zealandicum*. *Monophlebus Crawfordi* is described in the 'Transactions of the Royal Society of South Australia,' 1887–8.

"The following appear in my papers of this year, which are now in the printers' hands:—*Solenophora fagi* (gen. nov.), *S. corokiæ*, *Gossyparia cavelli*, *Rhizococcus pulchellus*, *R. totaræ*, *Dactylopius obtectus*, *D. aurilanatus*, *Trioza panacis*, *Aleurodes fagi*, *A. asplenii*, and *Eriococcus Raithbyi*.

"The following will be described in a paper to be read in our session of 1890:—*Eriococcus danthoniæ*, *Inglisia fagi*, *Leachia zealandica*, *Lecanochiton minor*, *Cælostoma pilosum*, *Psylla mimosæ*, and *Aleurodes drimydis*.

"I believe you will find all these insects both new and curious.

"Please note that *Inglisia patella* is very loosely attached to its leaf. *Rhizococcus pulchellus* loses almost all its beauty when dead, but in life it is an extremely beautiful object,—bright green, with silvery spikes. *Ctenochiton viridis* also loses its colours; perhaps one or two specimens may keep their vivid green until they reach you, but I fear not. *Cælostoma pilosum* is alive, and may reach you alive. Note, also, how closely, to the naked eye or with a weak lens, *Lecanochiton minor* seems to resemble *Aleurodes fagi*.

"*Leachia* is a genus hitherto new to New Zealand; had I

seen only the female, I should probably have taken it for *Monophlebus;* but the male has sixteen simple eyes in a ring, and the characteristic antennæ of *Leachia*, also no tassels on the abdomen. I think you will consider this male as a fine insect; unfortunately, I can only send one.

"*Gossyparia* is also new to this country. I hesitated long before I fixed the genus, but it has very frequently only a cushion of cotton with the dorsum exposed. I believe *Gossyparia* ought to be united with *Eriococcus*.

"*Dactylopius obtectus* is most peculiar, as it shelters itself under the little red scale of a bud of the plant. It can only be detected at sight by the little extruded cotton at the edges of this bud-scale. I know of no other Dactylopid which does this.

"*Selenophora* is a new genus, very peculiar from the 'spout' of the test. The male is in a narrow felted sac, like that of *Eriococcus*. What may be the use of this spout? Scarcely sexual; at least neither *Ctenochiton*, *Inglisia*, nor any Diaspid has any such apparatus."

Mr. Lewis also exhibited some specimens of the larvæ and imagos, both male and female, of *Icerya Purchasi* (Maskell), obtained from Natal, where it had proved very destructive to orange, lemon, and many other fruit trees. Specimens were also shown of the larva of an allied species from Natal, and originally assigned by Mr. Douglas to the genus *Ortonia*, but which Mr. Maskell is inclined to regard as a new species of *Icerya*. The male of this insect has not yet been found.

Mr. M'Lachlan and Mr. Elwes commented on the interesting nature of the exhibition, and the importance of a knowledge of the parasites of injurious insects, in connection with which special mention was made of the researches and discoveries of Prof. Riley.

Mr. H. Goss exhibited, on behalf of Mr. T. D. A. Cockerell, of Colorado, a large collection of insect-galls, and read the following letter from Mr. Cockerell on the subject:—

"West Cliff, Custer Co., Colorado, March 21, 1890.

"Dear Sir,—I have been so much interested in the rearing of gall-insects myself, that I venture to send you by this mail

a box of galls, all collected in this vicinity, from which the perfect insects will emerge in April or May. Will you kindly distribute these galls, at the next meeting of the Entomological Society, to those who are sufficiently interested to rear the insects? With the galls, I send also a batch of eggs of *Clisiocampa californica*, Pack. Some lepidopterist may like to rear the larvæ, which may be fed on willow or *Ribes aureum*. The galls sent are as follows:—

"A. On Rose.—(1) *Rhodites tuberculator*, Riley, large round roughish gall. (2) *R. ignota*, Osten-Sacken, smaller round smooth gall. (3) *R. bicolor*, Harris, round prickly gall. (4) *R. fusiformans*, Cockerell, oblong or irregular galls. (5) *R. rosæfoliæ*, Cockerell, flattish leaf-galls on withered leaves. (6) *R. globosus*, Cockerell, round smooth leaf-galls.

"B. On Willow.—(7) *Cecidomyia salicis-siliqua*, Walsh, fusiform red galls. (8) *C. salicis-strobiloides*, Osten-Sacken, bud-galls. (9) *Hormomyia salicum*, n. sp.?, reddish leaf-gall. (10) *Euura salicis-ovum*, Walsh, lateral oval galls, on twigs.

"C. On Compositæ.—(11) *Trypeta bigeloviæ*, Cockerell, woolly white galls, on *Bigelonia graveolens*. (12) Sp.?, woolly galls. (13) N. sp.?, galls at junction of branches and stems.

"From the above galls may be reared, besides the gall-makers, the following parasites and inquilines:—From *Rhodites ignota*:—*Periclistus pirata*, Osten-Sacken; *Eurytoma diastrophi*, Walsh; *Habrocytus obscuripes*, Ashmead; &c. From *R. bicolor*:—*Torymus magnificus*, Osten-Sacken; *Eurytoma diastrophi*, Walsh; *Tetrastichus rosæ*, Ashmead; &c. From *R. fusiformans*:—*Periclistus fusi*, Ckll. MS.; *Torymus chrysochlora*, Osten-Sacken; *Eurytoma diastrophi*, Walsh; &c. From *R. bicolor*:—*Habrocytus obscuripes*, Ashmead. From *R. ignota*:—*H. rosæ*, Ashmead. From *R. fusiformans*;—*H. rosæ*, Ashmead. From *Cecidomyia salicis-siliqua*:—*Nematus concolor*, Norton. From *Trypeta bigeloviæ*:—*Cecidomyia bigeloviæ*, Cockerell; *Torymus* sp.; &c. And many others from several of the galls, not yet specifically identified. Thus *C. salicis-strobiloides* galls produce three distinct Cecids, as well as many Chalcids.—Yours truly, T. D. A. Cockerell.

"The Secretary, Entomological Society of London."

Dr. Mason said he should be happy to take charge of these galls, with a view of rearing the insects and reporting the results.

Mr. Goss read the following letter from the Vicar of Arundel :—

"The Vicarage, Arundel, May 5, 1890.

"Sir,—The roof of the parish church of Arundel is very seriously affected by insects. It is a heavy oak timber roof, covered with lead, and some of the large old tie-beams (80 feet in length and 2 feet thick) are eaten to a very serious extent. I do not know whether your Society would be interested enough in the matter to investigate it. Maggots are found in hundreds in the wood, and at this time of the year a dull kind of brown beetle falls into the church, and they seem to be nibbling at the seats; at the same time a beetle, of a much more active kind, bright blue, makes its appearance. Is this a parasite, or a further development? We are entirely in the dark; and Mr. J. O. Scott, whom we consulted, does not know of any similar case. As the cost of tampering with the roof would be enormous, the vicar and churchwardens would be pleased to obtain information on the matter, and your Society would be doing a good turn in saving an historic church from destruction. If anyone would come down to see, I would be pleased to give them hospitality, or I would send up a box containing insects, &c.—I remain, yours faithfully, Robert Fisher.

"The Secretary, Entomological Society of London."

Mr. C. O. Waterhouse said he had already been consulted on the question some twelve months ago. The brown beetles referred to in Mr. Fisher's letter were *Anobium tessellatum*, F. (*Xestobium rufovillosum*, Deg., of some catalogues), and the blue one was *Corynetes rufipes*,* Deg. A small piece of one of the oak-beams from the roof of the church, reduced to a honey-comb condition, was exhibited in the Insect Gallery at the Natural History Museum. He had advised that the beams should be

* Before sending this sheet to press, I received a number of specimens from Mr. Fisher; these were all *Corynetes cærulcus*, Deg.—W. W. Fowler, Hon. Sec.

soaked with kerosene oil. The destructive character of the *Anobium* is well known, and Mr. Spence contributed some notes on the injury caused by it in the 'Proceedings' of this Society for May, 1836, p. xi. There is little doubt that the *Corynetes* is parasitic upon the *Anobium*, but this requires confirmation. Dr. Sharp, Mr. M'Lachlan, Dr. Mason, and the Chairman made some remarks on the subject.

Paper read.

Mr. H. W. Bates communicated a paper entitled "On new Species of *Cicindelidæ*."

June 4, 1890.

The Right. Hon. Lord Walsingham, M.A., F.R.S., President, in the chair.

Donations to the Library were announced, and thanks voted to the respective Donors.

Election of Fellows.

Mr. George William Carter, M.A., F.L.S., of Lime Grove, Knottingley, Yorkshire; and Mr. R. Newstead, of The Museum, Chester, were elected Fellows.

Exhibitions, &c.

The Rev. Canon Fowler exhibited, on behalf of Mr. J. Edwards, of Norwich, two specimens of *Ilybius subæneus*, Er., and a single specimen of *Bidessus unistriatus*, Schr. Mr. Champion alluded to the fact that the only recorded British specimen of the first-mentioned beetle had been taken many years ago at Peckham. The species is very closely allied to *I. fenestratus*, F., but the posterior tarsi of the male have the joints externally margined at their lower edge, whereas in the male of the last-mentioned species they are not margined; this character was very plain in the male specimen sent by Mr. Edwards. Lord Walsingham, in alluding to the exhibit, referred to the list of Norfolk Coleoptera compiled some years ago by Mr. Crotch, which appeared to have been lost sight of.

Mr. Verrall exhibited a specimen of a fly in amber, belonging to a genus allied to *Psychoda*.

Mr. McLachlan alluded to the damage done by insects to orange-trees in Malta, and stated that the Rev. G. Henslow had lately been studying the question; one of the chief depredators was the widely spread "fly," *Ceratitis citriperda*, well known as devastating the orange. He found, however, that another and more serious enemy was the larva of a large Longicorn beetle (*Cerambyx miles*, Bon.), which bores into the lower part of the stem and down into the roots, making large galleries; in all probability the larva, or that of an allied species, is the true *Cossus* of the ancients. Lord Walsingham stated that a species of *Prays* allied to *P. olcellus* and our common *P. curtisellus* was known to feed in the buds of the orange and the lemon in Southern Europe. Mr. Pascoe, Mr. Champion, and others took part in the discussion which followed.

Canon Fowler, on behalf of Miss Carr, exhibited a portfolio of drawings of Indian Lepidoptera and their food-plants.

Papers read.

The Rev. H. S. Gorham communicated a paper entitled "Notes on the species of the families *Lycidæ* and *Lampyridæ* contained in the Imperial Museum of Calcutta, with description of new species, and a list of the species at present described from India."

Mr. Neville Manders communicated a paper entitled "A Catalogue of the Rhopalocerous Lepidoptera collected in the Shan States, with notes on the country and climate."

The latter paper contained a very interesting description of the chief physical features of the Shan States and neighbouring parts of Burmah, with special reference to variations of altitude; an account was also given of the lake-dwellers on the Eutay lake, who built their houses on piles far out into the water, after the manner of the Swiss lake-dwellings.

A great deal of the collecting referred to in the paper was done while Mr. Manders was on active service; otherwise, as he observes, the list might have been largely extended, "as Entomology, during active service, can only be indulged in at odd moments."

July 2, 1890.

Prof. John O. Westwood, M.A., F.L.S., Hon. Life President, in the chair.

Donations to the Library were announced, and thanks voted to the respective Donors.

Election of Fellows.

Mrs. Bazett, of Springfield, Reading, and Mr. J. B. Hodgkinson, of Ashton-on-Ribble, Preston, Lancashire, were elected Fellows.

Exhibitions, &c.

Lord Walsingham exhibited some rare Micro-Lepidoptera collected by himself at Cannes, including *Eudemis helichrysana*, *Conchylis rubricana*, Millière; a new *Depressaria* from *Opoponax cheironium*, which is about to be described by M. A. Constant, and *Bucculatrix helichrysella*; and also a volume of drawings of larvæ of the genus *Eupithecia*, by Mr. Buckler, which formerly belonged to the Rev. H. Harpur Crewe.

Mr. M'Lachlan exhibited larvæ and cocoons of *Mecyna deprivalis*, Walk., sent by Mr. W. W. Smith, of Ashburton, New Zealand; the species feeds commonly on *Genista capensis*, an introduced plant. Mr. M'Lachlan remarked on the curious nature of the larva, and suggested that as the species was so closely allied to *M. polygonalis*, so extremely rare in this country, they might be interesting to British lepidopterists.

Mr. Jacoby exhibited abnormal specimens of a phytophagous beetle, *Metaxonycha tridentata*, Jac., in which one side of the thorax was furnished with teeth as in the type, whereas the other side was quite simple, and presented no trace of teeth.

The Rev. Canon Fowler, on behalf of Mr. J. Edwards, exhibited specimens of *Gyrinus colymbus*, Er., with specimens of *G. elongatus*, Aubé, for comparison; he also exhibited drawings of the ædeagus of both species proving their distinctness.

Mr. Bower exhibited *Phoxopteryx upupana*, bred from larvæ

feeding between united birch leaves at Chiselhurst, Sept., 1889; and *Scardia picarella*, bred from fungus collected in Durham in May, 1890.

Mr. S. Stevens, in speaking of a tour which he had lately made in Devonshire, remarked on the extreme scarcity of insects on the coast of that county as compared with the coasts of Kent and Sussex; there were very few larvæ, and the vegetation was very luxuriant and very little eaten; he thought it possible that the reason of the scarcity was the heavy rainfall of South Devon, which washed off and destroyed the young larvæ.

Mr. Barrett said that his experience had been the same, and that he attributed the scarcity of larvæ to the violence of the winds, which beat the insects from the trees.

Mr. F. H. Blandford remarked that he had found Coleoptera abundant on the Braunton Burrows, near Barnstaple, but very scarce in other localities. Mr. Mason and others took part in the discussion which followed.

Mr. Stevens further said that when at Exeter he visited the Museum, and was pleased to see the original specimen of *Plusia ni* in the late Mr. H. Dorville's collection, taken at Alphington, near Exeter, in August, 1868, and a specimen of *Callimorpha hera*, taken also at Alphington in August, 1871, which is about six miles from the locality in which the latter insect is now said to occur; both the specimens are in fine condition.

Papers read.

Prof. Westwood read a paper on a species of Aphis, received from Mr. E. Ernest Green, of Ceylon, affecting the bread-fruit tree, which he had named *Siphonophora artocarpi;* at the conclusion of his paper he alluded to the use of Paris-green as a destructive agent for insects.

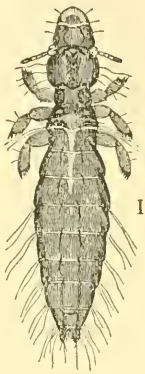
Mr. Blandford then made some remarks as to the use of London-purple (another arsenic compound) as an insecticide in the place of Paris-green; he stated that the compound was a waste product and one-tenth the cost of Paris-green, and further that it was more soluble and more easily applied; he was also of opinion that arsenic compounds do not greatly

affect sucking insects, such as Aphides, the ordinary kerosene preparations being more suitable for their destruction.

Lord Walsingham communicated the following description of a new species of *Nirmus*, sent to him by Mr. T. Southwell, of Norwich, who had received it from Dr. E. Piaget, of Bayard : the species was found on an extremely rare species of plover, *Ægialitis asiatica*, recently shot in Norfolk.*

Nirmus assimilis, *Piaget.*

Head conical, rounded in front, with a few short hairs ; trabecula not reaching beyond the first joint of the antennæ ; antennæ almost colourless, except the fifth joint, which is as long as the second or third ; eyes very slightly projecting, with a single hair ; temples rounded in front, furnished with two hairs ; occiput projecting over the thorax ; occipital bands indicated by a scarcely-coloured furrow ; antennal bands curved back towards the suture of the clypeus, which has a small central spot.



I

Prothorax slightly inserted beneath the occiput, with the sides a little convergent ; metathorax bell-shaped, with the posterior angles rounded and furnished with three long hairs, produced in a point over the abdomen in centre of posterior margin ; legs short and stout, coloured, tibiæ about as long as femora, with two setæ on their outer side and some small spines on their inner margin ; claws normal.

Abdomen elongate-oval, broadest at the third segment, with the posterior angles of each segment projecting and rounded, those of the first two segments without hairs, those of the next two or three with two long silky hairs, and the remainder, except the last, with three ; lateral bands produced in a sharp point into the anterior segment ; segments a little unequal in length, the central being the longest, with two long lateral and two short central hairs, dark, except towards the sutures,

* See 'The Zoologist,' August, 1890, p. 311.—H. G.

and a more or less abbreviated light central furrow, more or less developed, which ceases at the anterior third of the fourth segment; the first segment has the lateral margins parallel; the ninth is bilobed in the female and rounded in the male, with a single long silky hair, and a short terminal spine. The vulva is furnished with two narrow bands behind, and two spots in front; the genital organs of the male are normal.

The general colour is more or less dark chestnut, with blackish bands.

Dimensions: ♀ 22·2‴; ♂ 17·4‴.

On *Ægialitis asiatica:* the genus is closely allied to *N. acutifasciatus*, which infests *Plotus melanogaster*, and to *N. bicuspis*, Nitsch, which is parasitical on *Charadrius minor* and *C. hiaticula:* it differs in size, colour, and certain other details.

August 6, 1890.

Henry J. Elwes, Esq., F.L.S., F.Z.S., Vice-President, in the chair.

Donations to the Library were announced, and thanks voted to the respective Donors.

Election of Fellows.

Major-General George Carden, of Douglas Lodge, Surbiton, Surrey, and the Army and Navy Club, Pall Mall, S.W.; and Sir Vauncey Harpur-Crewe, Bart., of Calke Abbey, Derbyshire, were elected Fellows.

Exhibitions.

Mr. P. Crowley exhibited two species of butterflies from the West Coast of Africa, which he proposed to name respectively *Charaxes gabonica* and *Cymothoe marginata*. He also exhibited several other new species of butterflies from Sierra Leone and other parts of Africa, which had been recently described by Miss E. M. Sharpe, in the 'Annals and Magazine of Natural History' for July, 1890.

Prof. Meldola exhibited a male specimen of *Polyommatus dorilis*, Hufn., a common European and Asiatic species, which had been taken at Lee, near Ilfracombe, in August, 1887, by Mr Latter, then Demonstrator in the Laboratory of the Deputy Linacre Professor at Oxford, and now Science Master at the Charter-House School. At the time of its capture Mr. Latter supposed the specimen to be a hybrid between *Polyommatus phlæas* and one of the "Blues," and had only recently identified it as belonging to a well-known species. Mr. Stainton, Mr. Jenner Weir, and Colonel Swinhoe made some remarks on the specimen, and commented on the additions to the list of butterflies captured in the United Kingdom which had been made of late years.

Mr. W. F. H. Blandford exhibited, and made remarks on, five specimens of *Athous rhombeus*, Ol., bred from larvæ and pupæ recently collected by himself in the New Forest.

The Rev. Dr. Walker exhibited a large collection of Coleoptera which he had recently made in Iceland. The following genera, amongs others, were represented, viz.—*Patrobus*, *Nebria*, *Byrrhus*, *Aphodius*, *Philonthus*, *Barynotus*, *Chrysomela*, *Agabus*, *Creophilus*, and *Carabus*. Mr. Champion, Dr. Sharp, and the Chairman made some remarks on the collection.

Mr. Elwes exhibited three species of the genus *Atossa*, Moore, three of the genus *Elcysma*, Butl., and three of the genus *Campylotes*, West.,—all from the Himalayas and North-eastern Asia. The object of the exhibition was to illustrate the remarkable differences of venation in these closely allied forms of the same family. Colonel Swinhoe, Mr. Warren, Mr. Moore, and others took part in the discussion which ensued.

Paper read.

Mr. Crowley read a paper entitled "On some new species of African Diurnal Lepidoptera." In this paper the author described five new species of butterflies from the Cameroons, Madagascar, Sierra Leone, Gaboon and Accra; and enumerated seven new species recently described by Miss Sharpe in the 'Annals and Magazine of Natural History. The paper was illustrated by two plates of fifteen figures.

September 3, 1890.

Henry T. Stainton, Esq., F.R.S., F.L.S., in the chair.

Donations to the Library were announced, and thanks voted to the respective Donors.

Exhibitions, &c.

Mr. C. Fenn exhibited and remarked on specimens of *Eupithecia satyrata*, *Eudorea ambigualis*, and *Tortrix viburnana* from the neighbourhood of Darlington.

Mr. H. Goss exhibited, on behalf of Mr. Martin Stanger Higgs, a remarkable variety of *Melitæa aurinia* (*artemis*), taken a few years ago, in Gloucestershire, by Mr. Joseph Merrin.

Mr. Stevens stated that he had recently been to Liverpool, where he had seen the collection of the late Mr. Robertson, of Limehouse, which was still in fine condition, and contained a long series of *Polyommatus dispar*.

The Rev. Dr. Walker communicated some observations on the Entomology of Iceland, and gave an account of his recent travels in that island. He stated that he had taken *Bombus terrestris* this year, for the first time, in the north of Iceland (from which quarter of the island it had not been recorded by Dr. Staudinger), namely, at Akureyri at the southern end of the Eyjafjordr, 28 miles from the Arctic Ocean, and at Glárufoss, the picturesque waterfall, an hour's walk from Akureyri. He also referred to his visit to Berufjordr on the east coast, and to Husavik on the north coast, two fjords which he had not landed at in 1889, which made a total of sixteen fjords that he had scientifically visited. In reference to Husavik, he said he had been prevented by the rough sea and hopelessly wet weather from landing there in 1889, and also on his first voyage round Iceland this year, from the fact that the steamer anchored there too early in the morning, and then only at the entrance of Husavik Bay to allow of some Faroese quitting the steamer in their rowing-boat. On the second voyage round Iceland this year he succeeded in landing, and found insects far more plentiful

than he expected in so northerly a locality (Husavik is upwards of 66° N. lat.). The numbers of Diptera were astonishing; they were not the ordinary *Calliphora erythrocephala*, which occurs in numbers on rotting fish all round the island, but the species that frequents sea-weed on the sand. Multitudes of this fly flew on board the steamer, blackening the windows of the deck saloon, and some continued there until the vessel's arrival at Granton. Dr. Walker further observed that he had captured there about a dozen specimens of a small species of Ichneumon, which, along with numerous Diptera, had settled on soles that had been spread out on the greensward to dry. He also adverted to the rarity of Hymenoptera, whether Bombi or Ichneumonidæ, in Iceland, and to the fact of his having taken three specimens of a large species of Ichneumon at Akureyri, which might possibly not have been previously noticed in the country. He next described the great interest attaching to so northerly a place as Siglufjordr, the most northerly fjord that he had visited (lat. 66.9°), and stated that on that account he had taken careful note of all the species he had met with there. In 1889 he had not observed any moths there. *Plusia interrogationis* had been recorded by Staudinger as captured there by Finsterwalden in 1856, and to this he had now to add *Crymodes exulis*, *Coremia munitata*, and *Aphelia pratana*. Dr. Walker then remarked on the wide distribution, but at the same time extreme rarity, of a large dipterous insect striped like a Syrphus (*Sericomyia lappona*) that he had been the first to take in Iceland. He had to report its occurrence at Reykjavik in the south-west, Seydisfjordr on the east coast, and Akureyri on the north, but he only obtained six specimens in all, namely, two at Akureyri, one at Seydisfjordr, and three at Reykjavik. He said he had taken three additional specimens on the blossoms of the marsh marigold at Thorshavn in the Faroes, on June 9th, where he had also to report the capture of two species of *Eristalis* (a genus of Diptera not found so far north as Iceland), as well as of the following moths:— *Crymodes exulis*, *Charæas graminis*, *Coremia munitata*, *Coremia propugnata*, *Emmelesia albulata ?*, and *Scoparia ambigualis ?*.

Returning to the subject of Iceland, Dr. Walker said that last year he had only seen *Helophilus pendulus?* on the east and west coasts of the island; he had now also to report it from Akureyri in the north and from Reykjavik, where it and *Creophilus maxillosus* were far more plentiful than his experience of these two species in 1889 led him to expect. He considered the best localities for Coleoptera in Iceland, beyond all doubt, to be Reykjavik, Flatey Island off the west coast, and Akureyri and the coast-road leading from that place to Oddeyri. He said he had been led to visit Iceland at an earlier date this year than last year in the belief that he would thus meet with other species of insects. To some extent his anticipations had been fulfilled, for he had captured several specimens of *Melanippe thulearia*, which Dr. Mason—who had proceeded to Iceland a fortnight before him in 1889—had also taken; and he had now three new localities on the west coast for that species, namely Stykkisholmur, Dyrefjordr, and Patriksfjordr. It was a late season, and moths proved correspondingly late and scarce on his first arrival. From the wintry weather reported to him as having prevailed at Reykjavik, and his experience of the bitter cold in his first voyage round the island, he feared that he should meet with very indifferent success, but his fortune proved better as the season advanced. *Crymodes exulis* was by far the commonest of the Noctuæ, and *Coremia munitata* of the Geometridæ, of which last-named species he had taken the reddish variety. This type, however, though of frequent occurrence in Scotland, is rare in Iceland. He said that *Charæas graminis* had been taken for the first time on the north coast, but, as on the west, only very sparingly. *Noctua conflua* proved much the commonest Noctua last year, but though taken this year was not nearly so plentiful as *Crymodes exulis*. This was to be accounted for by its later appearance. Dr. Walker likewise gave an account of his visit to the Westmann Isles, and mentioned that he believed he was the first who ever collected on that group. He enumerated his captures of Diptera and Coleoptera there, and said he found these islands quite as good places for collecting insects as any spots on the mainland.

Dr. Walker said that the difficulty of landing was very great, but feeling satisfied it *could* be done, he was determined that it *should* be done. On June 12th, inspite of in disposition, owing to the heavy rolling of the steamer the whole of the previous day, he succeeded in landing under the following circumstances. The mail boat having already gone ashore he had to have recourse to a cargo boat from Copenhagen laden with sacks of flour for the natives, and the companion-ladder not being let down, he had to slew himself on one side on to a rope-ladder and descend hand over hand, and, as the bottom of the rope-ladder did not reach to the boat, to drop heavily on to the flour-sacks. He was then rowed for about a mile over a choppy sea to the shore, receiving an occasional dollop of salt-water in the face or over the whole of his waistcoat. Dr. Walker concluded by saying that notwithstanding the hardships he endured in landing he did not regret having done so, for, with some help in collecting from the juvenile population, he had been enabled to bring home to England the first insects recorded from the Westmann Isles.

In reply to a question by Mr. Stainton, Dr. Walker said that the flowers chiefly frequented by the humble-bees in Iceland, were those of a small species of white galium (probably *Galium saxatile?*) and *Viola tricolor*. Dr. Walker also added that this year he had taken Hemiptera in Iceland for the first time, namely, *Salda littoralis* (*Cimex littoralis* in Paijhull's List) the same species that Dr. Mason captured in 1889. He also said he had taken its larva at Reykjavik, and at Akureyri.

Messrs. M'Lachlan, Stainton, Jenner Weir, Stevens, Jacoby, Lewis and others took part in the discussion which ensued.

Papers read.

Dr. Walker contributed "Notes on *Calathus melanocephalus* collected in Iceland, the Westmann Isles, and the Faroe Isles."

Mr. A. G. Butler communicated a paper entitled "Further Notes on the synonymy of the genera of Noctuites."

October 1, 1890.

The Right Hon. Lord Walsingham, M.A., F.R.S., President, in the chair.

Donations to the Library were announced, and thanks voted to the respective Donors.

Exhibitions, &c.

The Rev. Dr. Walker exhibited a long and varied series of forms of *Crymodes exulis*, collected in June and July last in Iceland. In reply to a question by Lord Walsingham as to whether all the forms referred by Dr. Walker to *Crymodes exulis* had been identified as belonging to that species, Mr. Kirby said the species was a very variable one, and that several forms had been described from Labrador and Greenland. Mr. South stated that he had examined Dr. Walker's specimens, and he believed that most of the forms exhibited had been described by Dr. Staudinger in his papers on the Entomology of Iceland.

Dr. Sharp exhibited a specimen of *Ornithomyia avicularia*, L., taken near Dartford, to which there were firmly adhering —apparently by their mandibles—several specimens of a mallophagous insect. He also exhibited some specimens of fragile Diptera, Neuroptera, and Lepidoptera, to show that the terminal segments in both sexes might be dissected off and mounted separately without the structures suffering from shrivelling or distortion. Dr. Sharp also said, in reference to the statement made by him, on p. 421 of his paper recently published in the 'Transactions' of the Society, as to the number of the segments of the abdomen, and the position of the genital orifice in the female of Hemiptera-Heteroptera, that he had recently been making some dissections, and found that the structures externally were difficult of comprehension, and he now thought that the statement he had made from observation, without dissection, might prove to be erroneous.

Mr. G. F. Hampson exhibited and remarked on a series of *Erebia melas*, taken in July last, in the Austrian Alps (Dolomites), by Mrs. Nicholls. Mr. Elwes observed that though

this species was abundant in the Pyrenees and Southern Carpathians, and was also found in Greece, it seemed to be so rare in Carinthia that he had never been able to obtain specimens therefrom, and he was not aware that any German entomologist had taken it in the Tyrol or Dolomite Mountains. He added that the species only frequented very steep and stony slopes on the mountains, so that its capture was attended with difficulty.

Mr. M'Lachlan exhibited specimens of an extraordinary Neuropterous larva found by Mr. B. G. Nevinson in tombs at Cairo. He said that this larva had been assigned to the genus *Nemoptera* by Schaum, who described it as having been found in tombs in Egypt (Berl. Ent. Zeitschrift, vol. i.); and Roux had previously (Ann. Sci. Nat. t. xxviii) described and figured it as an abnormal apterous hexapod under the name of *Necrophilus arenarius*. Mr. Nevinson supplemented these remarks with an account of his capture of the specimens in the Egyptian tombs.

Mr. G. T. Baker exhibited a series of forms of species of the genus *Boarmia* from Madeira; and also a series of melanic varieties of *Gracilaria syringella* from the neighbourhood of Birmingham.

Mr. W. F. H. Blandford exhibited and remarked on a series of specimens of *Dermestes vulpinus*, which had been doing much damage to the roofs of certain soap-works in the neighbourhood of London, where they had no doubt been introduced with bones.

Mr. R. W. Lloyd exhibited a specimen of *Carabus catenulatus*, in which the femur of the right foreleg was curiously dilated and toothed. He stated that he took the specimen at Oxshott, Surrey, on the 27th September last.

The Rev. C. F. Thornewill exhibited an almost black variety of the male of *Argynnis aglaia*, taken by himself in July last on Cannock Chase; also a number of living larvæ of a species of *Eupithecia* feeding on the flower-heads of *Tanacetum vulgare* collected in a limestone quarry in Leicestershire. He expressed some doubt as to the identity of the species, but the general opinion was that the larvæ were only those of *Eupithecia absynthiata*.

Mr. H. Goss exhibited, for Mr. G. Bryant, a variety of the larva of *Trichiura crataegi*.

Mr. C. G. Barrett exhibited a specimen of *Plusia moneta*, Fabr., a species new to Britain, taken at Reading by Mr. W. Holland in July last. It was stated that the first specimen of this species captured in England had been taken at Dover last June, and is now in the collection of Mr. Sydney Webb, of that town. Mr. Kirby said that Mynheer Snellen had reported this species as being unusually common in Holland a few years ago.

Mr. W. Dannatt exhibited a variety of *Papilio hectorides* from Paraguay. Mr. Osbert Salvin said he believed he had seen this form before.

Mr. C. J. Gahan exhibited a curious little larva-like creature, found by Mr. A. P. Green in a rapid mountain stream in Ceylon, and observed that there was some doubt as to its true position in the animal kingdom. It was suggested that it might possibly be an insect larva, and he was desirous of eliciting information on this point. He could find no account of any insect larva with a similar structure. It was made up of six distinct segments, each of which bore a single pair of laterally directed processes or unjointed appendages coming off from the ventral side of the body a little below the margin of the hard dorsal shield. Near the inner base of each of these processes was a bundle of five club-shaped, apparently branchial, filaments. Each segment had on the middle of the under side a comparatively large sucker. The anterior segment was furnished with a pair of two-jointed antennal structures, in addition to a few stout bristles.

Mr. Hampson supplemented these remarks by stating that just behind the mouth, which was placed not far from the anterior margin on the under side, was a pair of broad flattened jaws with rasp-like teeth, and that there was nothing that resembled the mandibles of an insect. The appendages, which were towards the sides and unjointed, were, he said, very suggestive of the *parapodia* of certain chætopod worms; but that all the known polychætous worms were marine.

Mr. Gahan agreed with these remarks, and said that the animal seemed to have very much the characters of a polychætous worm. Lord Walsingham and Mr. M'Lachlan

expressed an opinion that the animal was of myriopodous affinities, and was not the larva of an insect.

Papers read.

Mr. Baker read a paper entitled "Notes on the genitalia of a gynandromorphous *Eronia hippia*."

The Rev. Dr. Walker read the following "Notes on *Crymodes exulis*."

"Newman observes of this species:—'The moth appears on the wing in July, and has been brought in great numbers from Iceland. It flies during the day, and may sometimes be seen flying in crowds about the flowers scattered sparingly over the surface of the ground.' It is, however, equally the fact that it is on the wing by the middle of June, as, for example, I captured it at Akureyri on the 19th of June this year; and as young friends there collecting on my behalf had a few then in store for me, it is reasonable to suppose that it had first been seen at all events a week previously. We shall probably not be far wrong in asserting that the period when it occurs in the best condition and in the greatest numbers is from about the middle of June to the middle of July. *Noctua conflua* is met with, but much more sparingly in June, but becomes particularly abundant and is quite the commonest Noctua just at the time that *Crymodes* begins to be scarce. Both species agree in this particular,—in the very variable tint and markings of the fore wings. Both kinds greatly affect the wild thyme, on which they are often found asleep; *Crymodes*, however, is the more active of the two, and is frequently to be seen flying about, as Mr. Newman describes, or hovering round the flowers.

It was at Akureyri, at the southern extremity of the Eyjafjordr (28 miles from the north coast of Iceland and the Arctic Ocean) that I found this moth in the greatest numbers. My observations on the present occasion will accordingly have reference chiefly to its different types, as occurring there on *Viola tricolor*, *Galium saxatile*, *Thymus serpyllum*, *Silene acaulis*, *Dryas octopetala*, &c. Out of upwards of 350 specimens collected by myself, and by the young

friends above mentioned on my behalf, I have picked out representatives of about thirteen types or forms which I have brought with me for exhibition to-night, *viz.* :—

1. Marbled type.
2. Dark marbled type.
3. Light brown marbled type.
4. Brown marbled type.
5. Dark type.
6. Dark one-spot type.
7. Light brown one-spot type.
8. Marbled one-spot type.
9. Marbled two-spot type.
10. Brown white patch type.
11. Light brown type.
12. Dusky marbled type.
13. Brown type.

These types or varieties, however, occur in very disproportionate numbers. No. 1, the marbled type, among those from Akureyri, submitted for your inspection, is, in my opinion, the handsomest; No. 4, the brown marbled type, is decidedly the commonest; No. 9, the marbled two-spot type, and No. 3, the light brown marbled type, are likewise fairly common; but No. 1, 3. 4, are connected by almost imperceptible gradations. Such types have a tendency to melanism. Nos. 2, 5, 6 and 8, are decidedly scarce; No. 11 would seem to be also very rare; and it may be laid down as a general principle that the normal forms are the variegated and very elaborately marked ones, and those that possess only one, or almost only one, uniform tint are decidedly scarce.

Below the Akureyri specimens you will note three from Siglufjordr, highly interesting as representing three varieties, Nos. 1, 2 and 11 of the Akureyri ones, and also as occurring in the high latitude of 66.9°, and, again, because Finsterwalden is not reported as having obtained this species here in 1856. On the other side of the box, the two specimens from Reykjavik correspond to Nos. 1 and 2 of the Akureyri ones; the three from the road to Hengill Mt., to Nos. 1, 2 and 12 of the Akureyri; the one from Dyrefjordr, to No. 9; and the three from Stykkisholmur, to Nos. 1, 2 and 4 of the Akureyri; and the one with wings closed, from Thorshavn, Faroe Isles, to No. 4.

Among the few specimens I brought back of this species in 1889, Nos. 2, 4 and 12 are represented; and one var. caught for

me by Dr. Knaggs, at Krisuvik, resembling No. 5, but darker. The browner forms decidedly predominated, as they did, to the best of my recollection, among the numerous specimens that I then took at the Geysir, which were hopelessly spoiled during a jolting ride over the plain on my return.

According to Newman's figuring, *Crymodes exulis* differs from the Scotch *Hadena assimilis* in having more cream-coloured markings and more distinctly defined ones, in its wings being slightly smaller than those of the latter, and in its body being rather longer and a trifle more slender.

Two other species of *Hadena* are stated by Newman to be generally distributed in England, Scotland, and Iceland, namely, *Hadena contigua*, the beautiful brocade, and *H. Pisi*, the brown moth. I took two specimens of *H. contigua* at Akureyri this year, and one specimen of an *Hadena* closely allied to *H. pisi*. In my last year's list there is also a record of an *Hadena* approaching *pisi* termed var. *Akureyriensis*, from its having been taken at Akureyri; this, however, I seem to have unfortunately lost. In Staudinger's List this insect is set down as *Mamestra pisi;* he gives no locality, but if taken by himself it must have been somewhere in the south-west of Iceland. The prevalence of the genus *Hadena*, in the north of the island is partly borne out by the fact that Krueper, one of Staudinger's companions, took another species, *H. Sommeri*, at Hofios on the Skagafjordr."

November 5, 1890.

The Right Hon. Lord Walsingham, M.A., F.R.S., President, in the chair.

Donations to the Library were announced, and thanks voted to the respective Donors.

Election of Fellows.

Mr. Francis H. Barclay, of Knott's Green, Leyton, Essex; Miss M. Kimber, of Cope Hall, Enborne, Berkshire; and Mr. John E. Robson, of Hartlepool, were elected Fellows.

Death of Mr. E. T. Atkinson.

Lord Walsingham announced the death of Mr. Atkinson, of the Indian Museum, Calcutta.

Exhibitions, &c.

Mr. A. H. Jones exhibited a number of Lepidoptera collected in June last near Digne, Basses Alpes, including *Papilio Alexanor*, *Parnassius Apollo*, larger and paler than the Swiss form; *Anthocharis tages* var. *Bellezina*; *Leucophasia Duponcheli*; *Thecla spini*; *Thecla ilicis* var. *cerri*; *Lycæna argiades* var. *corretas*; *L. argus* var. *argyronomon*; *L. bellargus* var. *ceronus*; *Melitæa deione*; and *Argynnis Euphrosyne*.

Mr. W. E. Nicholson also exhibited a collection of Lepidoptera, formed near Digne last June, which included very large specimens of *Papilio Machaon*; *P. Podalirius*; *Thais rumina* var. *medesicaste*, larger and redder than the Mediterranean specimens; *Apatura ilia* var. *clytie*; *Argynnis adippe* var. *cleodoxa*; *A. Daphne*; *Melanargia galatea* var. *leucomelas*; *Vanessa egea*, bred from Pellitory; *Satyrus semele*, and many others.

Mr. C. O. Waterhouse exhibited the upper and lower membranes of a wing of a species of *Attacus*, which had been separated without removing the scales and mounted on glass so as to show the internal surfaces. He explained that he separated the membranes by inserting a needle in the vein at the base of the wing, and when they were sufficiently parted to be taken hold of they were gradually drawn asunder and floated on water until the two membranes were entirely separated. He said that some years ago Dr. Hagen had shown that this could be done with fresh examples of *Libellulæ*. The specimen exhibited had been operated upon a few hours after leaving the chrysalis; but he had also succeeded fairly well in separating the membranes of a wing of a dried *Cicada*.

Dr. D. Sharp exhibited a photograph he had received from Prof. Exner, of Vienna, showing the picture obtained at the back of the eye of *Lampyris splendidula*. He stated that this picture is continuous and not reversed, and shows the outline of lights and shades of objects at a distance as well as of those closer to the eye.

Mr. H. Goss exhibited a specimen of *Zygæna filipendulæ* var. *chrysanthemi*, which he had taken at Rhinefield, in the New Forest, on the 15th July last, when in the company of Mr. George Bryant. Dr. P. B. Mason said this variety was known on the Continent of Europe, and was figured by Hübner in his 'Sammlung,' a copy of which work he exhibited. He added that he possessed a similar specimen of this variety taken by Mr. Nowers in Wyre Forest, Worcestershire. Colonel Swinhoe stated that he possessed a similar variety of a species of *Syntomis*.

The Rev. Dr. Walker exhibited a number of Diptera, Hymenoptera, and Coleoptera recently collected in Iceland; also some drawings illustrating the various forms of *Crymodes exulis* occurring in Iceland which he had shown at the October meeting of the society; he also exhibited seven varieties of *Melanippe thulearia*, nine of *Coremia munitata*, and a few of *Noctua conflua*, illustrating the varied forms of these species occurring in Iceland. Dr. Mason said that the only British specimens of *N. conflua* which he had seen resembling the Iceland form of the species were taken at Wolsingham, Durham.

Mons. A. Wailly exhibited and remarked on a number of Lepidoptera from Japan. The collection comprised the following species:—*Orthogonia sera*, Felder; *Remigia archesia*, Butler; *Herminia fumosa*, Butl.; *Herminia arenosa*, Butl.; *Hypena stygiana*, Butl.; *H. minna*, Butl.; *Bocana tristis*, Butl.; *Thalassodes ambigua*, Butl.; *Abraxas elegans*, Butl.; *Parepione lapidea*, Butl.; *Platydia casta*, Butl.; *Egnasia polybapta*, Butl.; *Marmorinia obscurata*, Butl.; *Pseudolocastra inimica*, Butl.; *Hydrillodes lentalis*, Guén.; *Calobochyla mollis*, Butl.; *Inuoris tenuis*, Butl.; *Pagyda quadrilineata*, Butl.; *Notarcha pallidalis* Warren; *Pyrausta astrifera*, Butl.; *Bocchoris inspersalis*, Zell.; *Nothophyle pantherata*, Butl.; *Crambus pinellus*, Linn.; *Mimorista butyrosa*, Butl.; *Stenomeles consocialis*, Warren; *Rhynchina plusioides*, Butl.; *Diasemia literata*, Scop.; and *Cæsia similis*, Butl. Besides these there were eleven species undetermined, which, it was stated, were not represented in the British Museum collections.

Mr. A. C. Horner exhibited a number of rare species of

Coleoptera, including *Homalota crassicornis*, Gyll.; *H. fimorum*, Bris.; *H. humeralis*, Kr.; and *Euryporus picipes* Pk.; collected at Church Stretton, Shropshire; and also *Amara nitida*, Sturm.; *Oxypoda amœna*, Fair.; *Homalota testaceipes*, Heer; *Lithocharis apicalis*, Kr.; and *Epuræa neglecta*, Heer, from the neighbourhood of Tonbridge.

Mr. Meyer Darcis exhibited a specimen of *Termitobia physogastra*, Gangelb., a new genus and species of *Brachelytra* obtained in a white ant's nest from the Congo. Dr. Sharp commented on the interesting nature of the exhibition.

Colonel Swinhoe exhibited a collection of moths from Southern India, which comprised about forty species, distributed amongst the following families:—*Syntomidæ*, *Lithosiidæ*, *Arctiidæ*, *Lasiocampidæ*, *Zerenidæ*, *Fidonidæ*, *Leucanidæ*, *Heliothidæ*, *Acontiidæ*, and *Poaphilidæ*.

The Secretary read the following extract from a letter from Mr. Philip Crowley, on the subject of the species of *Charaxes* which he had described and figured in Part III. of the Transactions of the Society:—"I hear from Mons. Ch. Oberthür that the *Charaxes* I described and figured in the last number of the 'Transactions' as* *Charaxes gabonica* is identical with *Charaxes Hadrianus* of Ward, described in Ent. Mo. Mag, viii. p. 120, 1871. I have referred to this vol. of the Ent. Mo. Mag. and find Mons. Oberthür is correct. I am very sorry I omitted to notice this when searching for the species, but having made the mistake I can now only correct it in this manner."

Papers read.

Colonel Swinhoe read a paper describing the species exhibited by him entitled "New Species of Moths from Southern India."

The Rev. T. A. Marshall communicated a paper entitled "A Monograph of British Braconidæ. Part IV."

Lord Walsingham read a paper entitled "African Micro-Lepidoptera." In this paper nine new genera were described, *viz.*:—*Autochthonus*, type *A. chalybiellus*, Wlsm.; *Scalidoma*,

* See Trans. Ent. Soc. Part III. 1890, Plate xvii. fig. 3.—H. G.

type *Tinea horridella*, Wkr.; *Barbaroscardia*, type *B. fasciata*, Wlsm.; *Odites*, type *O. natalensis*, Wlsm.; *Idiopteryx*, type *Cryptolechia obliquella*, Wlsm.; *Microthauma*, type *M. metallifera*, Wlsm.; *Licmocera*, type *L. lyonetiella*, Wlsm.; *Oxymachæris*, type *O. niveocervina*, Wlsm.; *Micropostega*, type *M. æneofasciata*, Wlsm. Several European genera were recorded as new to the African fauna. The American genera *Phœcasiophora*, Grote; *Œta*, Grote; *Polyhymno*, Chamb.; *Strobisia*, Clem.; *Anorthosia*, Clem.; *Ide*, Chamb., and *Zarathra*, Wkr., were described as occurring in Africa. The genus *Philobota*, Meyr., hitherto confined to the Australian region, was also recorded. The Indian genus *Timyra*, Wkr., was represented in Africa. *Nigilgia*, Wkr., was identified as a synonym of *Phycodes*. *Polyhymno*, Chamb., had been re-described as *Copocercia* by Zeller. *Teratopsis*, Wlsm., was a synonym of *Cacochroa*, Hein. Seventy-one species were described as new.

December 3, 1890.

The Right Honourable Lord Walsingham, M.A., F.R.S., President, in the chair.

Donations to the Library were announced and thanks voted to the respective donors.

Election of Fellows.

Mr. John Gardner, of 6, Friar Terrace, Hartlepool; and Mr. Samuel James Capper, F.L.S., of Huyton Park, near Liverpool, were elected Fellows.

Exhibitions, &c.

Dr. D. Sharp exhibited specimens of *Papilio polites*, *P. erithonius*, and *Euplœa asela*, received from Mr. J. J. Lister, who had caught them on board ship when near Colombo, in November, 1888. Dr. Sharp read a letter from Mr. Lister, in which it was stated that from the ship hundreds of these

butterflies were seen flying out to sea against a slight breeze. Many of them, apparently exhausted by a long flight, alighted on the deck of the ship, and large numbers perished in the sea.

Lord Walsingham exhibited a coloured drawing of a variety of *Acherontia atropos*, which had been sent to him by Mons. Henri de la Cuisine, of Dijon. He also exhibited specimens of an entomogenous fungus, apparently belonging to the genus *Torrubia*, growing on pupæ (received from Sir Charles Forbes), which had been collected in Mexico by Mr. H. B. James. Mr. M'Lachlan expressed an opinion, in which Mr. C. O. Waterhouse and Mr. G. C. Champion concurred, that the pupæ were those of a species of *Cicada*. Mr. F. D. Godman said that at the meeting of the Society on the 3rd October, 1888, he had exhibited a larva of a *Cicada* with a similar fungoid growth. The specimen was subsequently produced, and the fungus proved to be identical with that on the pupæ shown by Lord Walsingham.

Mr. R. Adkin exhibited male specimens of *Spilosoma mendica*, Clk., bred from ova obtained from a female of the Irish form which had been impregnated by a male of the English form. These specimens were of a dusky white colour, and were intermediate between the English and Irish forms.

Mr. F. Merrifield showed samples of a material known as "cork-carpet," and explained its advantages as a lining for cabinets and store-boxes. Dr. Sharp fully endorsed the opinion expressed by Mr. Merrifield.

Mr. R. W. Lloyd exhibited specimens of *Anisotoma Triepkei*, Schmidt, and *Megacronus inclinans*, Er., collected last August at Loch Alvie by Aviemore.

Mr. Hamilton H. Druce exhibited several very beautiful species of butterflies, belonging to the genus *Hypochrysops*, from the Solomon Islands and Australia.

Papers, &c., read.

Mr. Merrifield read a paper entitled, "On the conspicuous changes in the markings and colouring of Lepidoptera caused by subjecting the pupæ to different temperature conditions."

In this paper it was stated that the results of many experiments made on *Selenia illustraria* and *Ennomos autumnaria* tended to prove that both the markings and colouring of the moths were materially affected by the temperature to which the pupæ were exposed: the markings by long continued exposure before the last active changes; the colouring, chiefly by exposure during these last changes, but before the colouring of the perfect insect began to be visible, a moderately low temperature during this period causing darkness, a high one producing the opposite effect, and two or three days at the right time appearing in some cases sufficient. Dryness or moisture applied during the whole pupal period had little or no effect on either markings or colouring. Applying the facts thus ascertained, Mr. Merrifield said he had obtained from summer pupæ of *illustraria*, besides moths with summer markings and colouring, some moths with summer colouring and spring markings, some with spring markings and almost spring colouring, and some with summer markings, but an approach to spring colouring. These specimens, with enlarged and coloured photographs of them were exhibited.

Lord Walsingham thanked Mr. Merrifield for his valuable paper, and said he thought that it was proved conclusively that the effect of retardation by the means applied in the pupal stage was to cause a tendency to the darker colouring characteristic of the winter brood. If it could be established that changes of temperature were a direct cause of variation, not only throughout a series of generations, but in each individual case, the discovery would be extremely interesting, especially if the insects themselves derived any distinct advantage from such varietal changes.

Mr. C. Fenn exhibited a long series of *E. autumnaria*, embracing, he thought, all the shades of colouring obtained by Mr. Merrifield, though the pupæ had all been kept at the same temperature, in a room facing the east; they were the produce of three consecutive years, in each of which the moths had been several weeks in emerging.

Mr. Waterhouse pointed out that the temperature might

have varied a good deal during the time that Mr. Fenn's insects were in the pupa state.

Mr. Jenner Weir, who said that he had been to Mr. Merrifield's house and examined his arrangements for forcing and retarding the emergence of moths from the pupæ, bore testimony to the careful way in which Mr. Merrifield's experiments were conducted.

Colonel Swinhoe said he considered that the amount of light at the time of the emergence of the moth influenced the colouring, and suggested that attention should be directed to to this in any further experiments.

Mr. Elwes expressed the opinion that many other causes besides temperature had their influences.

Mr. C. G. Barrett thought that in a hilly country moths were darker than in the plains. The black *betularia* were spreading in districts far removed from any smoky atmosphere. Mr. M'Lachlan, Mr. G. T. Porritt, and others, continued the discussion.

Mr. Merrifield, in reply, said that with regard to Mr. Fenn's *autumnaria*, it was probable that during the three summers in question some of the pupæ had been subjected to very different temperatures; he had found a variation of 15 degrees F., or less, applied at the right time, sufficient to make all the difference between a very light and a very dark *autumnaria*. He thought it was proved beyond doubt that, in the two species experimented on by him, temperature had been the chief cause of difference in colouring, though the hereditary tendencies of the particular brood, and the variability of the individuals, had their share in the production of the variations. He quite believed, also, that in many cases other and different causes operated; for example, in the case of the dark *Gnophos obscurata* he was disposed to think that it was a fixed variety, the colour being a protective one, caused by the gradual assimilation of the colour of the moth to the colour of the soil on which it reposed.

Mr. G. T. Baker read a paper entitled "Notes on the Lepidoptera collected in Madeira by the late T. Vernon Wollaston." The paper was illustrated by a number of figures drawn and coloured some years ago by Professor Westwood.

Mr. Hamilton H. Druce read a paper entitled "A Monograph of the Lycænoid genus *Hypochrysops*, with descriptions of new species."

Mr. C. J. Gahan read the following "Notes on some species of *Diabrotica*":—

"Being at present engaged in arranging the species of *Diabrotica* in the British Museum collection, I find it necessary to alter some specific names previously used for other species. The names which I propose to substitute are as follows:—*D. subrugosa* for *D. rugulosa*, Baly, Trans. Ent. Soc. 1890, p. 64, nec Baly, Trans. Ent. Soc. 1886, p. 450. *D. tarsata* for *D. tarsalis*, Baly, Ent. Mo. Mag. xxv. p. 254; nec Harold Col. Hefte, xiii. p. 92; nec Baly, Trans. Ent. Soc. 1890, p. 23. *D. crucigera* for *D. cruciata*, Baly, Ent. Mo. Mag. xxv. p. 253; nec Jacoby, Biol. Cent. Am. Col. vi. p. 547. *D. Balyana* for *D. melanocephala*, Baly, Trans. Ent. Soc. 1886, p. 455; nec Fab.; nec Baly, Trans. Ent. Soc. 1890, p. 13. *D. melanospila* for *D. spiloptera*, Baly, Proc. Zool. Soc. 1889, p. 92; nec Baly, Journ. Linn. Soc. xix. p. 242. *D. socia* for *D. tetraspilota*, Baly, Journ. Linn. Soc. xix. p. 254; nec. Baly, Trans. Ent. Soc. 3rd Ser. Vol. II. (1865), p. 351."

ANNUAL MEETING

January 21st, 1891.

The Right Honble. Lord Walsingham, M.A., F.R.S., President, in the chair.

An abstract of the Treasurer's Accounts was read by Mr. Herbert Druce, one of the Auditors.

Mr. H. Goss, one of the Secretaries, then read the following:—

Report of the Council.

In accordance with the Bye-Laws, the Council begs leave to present the following Report:—

During the year 1890 five Fellows have died, *viz.*, Mr. Joseph S. Baly, M.R.C.S., Mr. Arthur Bliss, Mr. William Copperthwaite, Mons. l'Abbé de Marseul, and Mr. Owen Wilson; four Fellows have been struck out of the list for non-payment of their subscriptions; and 27 new Fellows have been elected.

The number of Fellows elected during the year is the largest on record, with the exception of that for 1886, when the number was greatly augmented by the conversion of Subscribers into Fellows. Notwithstanding the yearly increase in the number of Fellows, the Council is still obliged to refuse or postpone the publication of valuable papers and plates for want of funds, and therefore it feels again bound to urge the Fellows to do their utmost to induce their friends to join the Society and thus increase its revenue.

At the present time the Society consists of an Hon. Life-President, 10 Honorary Fellows, 46 Life Fellows, and 278 paying the Annual Subscription, making the total number of Fellows now on the Society's List 334, which, after allowing for the losses by deaths and exclusions, is an increase in number of 18 since the date of the Annual Meeting last year.

The Transactions for the year 1890 form a volume of 691 pages, containing 20 memoirs contributed by the following 17 authors, *viz.*, the late Mr. Joseph S. Baly, M.R.C.S.; Mr. Lionel de Nicéville; Dr. Frederick Augustus Dixey, M.A.; Mr. Frederic Merrifield; Colonel Charles Swinhoe (2 papers); Mr. Charles J. Gahan, M.A.; Mr. Henry J. Elwes; Dr. David Sharp, F.R.S. (2 papers); Mr. James J. Walker, R.N.; Professor John O. Westwood, M.A. (2 papers); Mr. Edward Meyrick, B.A.; Mr. Henry W. Bates, F.R.S.; Mr. Neville Manders, M.R.C.S.; The Rev. Henry S. Gorham; Mr. Philip Crowley; Mynheer Pieter C. T. Snellen; and Mr. Arthur G. Butler.

Of these 20 papers 12 relate to Lepidoptera (or to enquiries in which Lepidoptera were the subjects of experiment); 6 to Coleoptera; and 2 to Hemiptera.

The memoirs above referred to are illustrated with 21 plates, of which 11 are coloured.

The Society is indebted to Mr. F. Merrifield for half the cost of Plates IV. and V.; to Mr. Elwes for the entire cost of Plates X., XIX., and XX.; to Dr. Sharp for £5 towards the cost of Plates XII., XIII., and XIV.; to Mr. Godman for the entire cost of Plate XVI.; and to Mr. Crowley for the entire cost of Plates XVII. and XVIII.

The Proceedings, containing an account of the exhibitions and discussions at the Meetings, in addition to certain short papers not published in the Transactions, extend to 47 pages.

The financial position of the Society appears at first sight less satisfactory than it has been of late years, the total receipts for 1890 being smaller than in 1889, although the amount received in entrance fees and subscriptions is much larger; but the deficiency in the amount of the total is explained by the fact that during the past year not a single composition has been received, whereas, in 1889, two compositions alone added £31 10*s.* to the total receipts. Making allowance for this, the actual yearly income of the Society is larger this year than it has ever been before. The balance carried forward is unusually small; but the thickness of the volume of Transactions, and the number of the plates, will show that the Society's income for the year has been well spent.

During the past year nearly 200 Books, Pamphlets, Journals, and Papers have been added to the Library; the average number of Fellows attending the Meetings has been far greater than in any previous year of the Society's existence, and there has been a gain of 18 new Fellows.

Notwithstanding the smallness of the balance carried forward, and the decrease, for the reasons explained, in the total of the receipts, the Council considers it has reason to congratulate the Fellows on the progress made by the Society during the year 1890.

The following is an Abstract of the Receipts and Payments during 1890:—

Receipts.	£	s.	d.
Balance in hand 1st Jan., 1890	18	4	8
Contributions of Fellows	334	19	0
Sale of Publications	71	6	1
Donations	21	14	0
Interest on Consols	10	18	9
	£457	2	6

Payments.	£	s.	d.
Rent, Office Expenses & Salary to Resident Librarian	152	5	7
Printing	213	6	1
Plates, &c.	77	13	6
Books, Binding, &c.	11	9	5
Balance in hand	2	7	11
	£457	2	6

11, Chandos Street, Cavendish Square, W.
January 21*st*, 1891.

The Secretaries not having received any notice proposing to substitute other names than those contained in the lists prepared by the Council, the following Fellows constitute the Council for 1891:—The Rev. Canon Fowler, M.A., F.L.S.; Frederick D. Godman, M.A., F.R.S.; Herbert Goss, F.L.S.; Ferdinand Grut, F.L.S.; Robert M'Lachlan, F.R.S.; Prof. Raphael Meldola, F.R.S.; Edward Saunders, F.L.S.; Richard South; Dr. David Sharp, F.R.S.; Henry T. Stainton, F.R.S.; Colonel Charles Swinhoe, F.L.S.; George Henry Verrall; and the Right Hon. Lord Walsingham, M.A., F.R.S.

The following are the Officers elected:—*President*, Mr. Frederick Du Cane Godman; *Treasurer*, Mr. Robert M'Lachlan; *Secretaries*, Mr. Herbert Goss and the Rev. Canon Fowler; *Librarian*, Mr. Ferdinand Grut.

Lord Walsingham, the retiring President, then delivered an Address, at the conclusion of which, Dr. Sharp proposed a vote of thanks to Lord Walsingham for his services as President during the year, and for his Address.

The proposal was seconded by Mr. M'Lachlan and carried unanimously.

A vote of thanks to the Treasurer, Secretaries, and Librarian was moved by Mr. M'Lachlan, seconded by Mr. S. Stevens, and carried unanimously.

Lord Walsingham, Mr. Goss, and Mr. Grut severally replied.

Abstract of Receipts and Payments for 1890.

Receipts.	£	s.	d.
Balance in hand 1st Jan., 1890	18	4	8
Subscriptions, 1890	268	16	0
Entrance Fees	50	8	0
Arrears	15	15	0
Donations	21	14	0
Sale of Transactions	71	6	1
Interest on Consols	10	18	9
	£457	2	6

Payments.	£	s.	d.
Rent, Salary to Assistant-Librarian, and Office Expenses	152	5	7
Printing	213	6	1
Plates, Colouring, &c.	77	13	6
Books, Binding, &c.	11	9	5
Balance in hand	2	7	11
	£157	2	6

ASSETS.

	£	s.	d
Subscriptions, considered good	5	5	0
Consols £411 11 2 (cost) 392 18 0			

LIABILITIES.

(Nil.)

Audited and found correct, January 14th, 1891.

Herbert Druce.
Richard South.
Ferdinand Grut.
Robert McLachlan.

THE PRESIDENT'S ADDRESS.

Gentlemen,

With your permission, I propose to limit the scope of my address to you this evening, and, for two reasons, it will be brief. The first reason is insufficient in itself, and is merely this, that having a vast number of other things to attend to, and being obliged to regard my rather intermittent studies in Entomology as a recreation confined to leisure hours, I have not been able during the past few months to devote more than a very limited attention to the subject of a Presidential Address. This I should hold to be but a poor excuse, if an excuse be required; but my second reason is one to which I think more weight should be attached, in the interests of the Society itself.

The list of your Presidents has included the names of many men distinguished by scientific attainments—men who, unlike myself, have been fully capable of enlightening and instructing the Fellows of this Society upon general or special entomological subjects, probably with far less exertion to themselves, than would be required, in one less thoroughly informed, to produce a bare summary of the events of the year as connected with our favourite study; nevertheless many such men, however highly they would appreciate the honour of presiding over the interesting meetings of this Society, might not unreasonably hesitate to accept the responsibility of composing and delivering a Presidential Address. In many cases it might be thought to interfere with the course of systematic work already taken in hand, and I have no doubt whatever that you would find it easier to secure the services of those whom you would most desire to elect to occupy this chair, if they could feel that they

would be relieved—or perhaps, at least, partially relieved—from the necessity of special literary work in connection with their annual duties. This consideration applies with equal force to the choice of President in many other societies. There are others, such as the Zoological Society, which have entirely dispensed with this necessity. But I do not suggest that it would be well to go so far as this; I merely wish, on the present occasion, at least, to revert to some extent to the precedent offered by some of your former Presidents, and to acknowledge myself a sinner in having been one of those to depart from the excellent maxims which inculcate the value of brevity.

Much good entomological work has been done during the past year. I shall not trespass upon the province of those who compile our annual Record, but it is always satisfactory to be able to refer to what is being done by private enterprise, prompted by a love of science. Such publications as those of Edwards and Scudder in America, of Romanhoff in Russia, of the Oberthürs in France, and Godman and Salvin in this country, must always command our admiration. Many others are doing good private work, although perhaps on a somewhat smaller scale; and Mr. Moore's courageous undertaking in commencing the 'Lepidoptera Indica,' on the lines already adopted in his 'Lepidoptera of Ceylon,' is a task worthy of a veteran. Such are a few only of the contributions to entomological work which form a valuable addition to what is being constantly done in current periodicals, and in the Proceedings and Transactions of the learned Societies of all countries where Science is cultivated. Periodical publications are always on the increase, and it becomes every year more and more difficult for specialists to avoid missing some important papers or descriptions within a reasonable time after their appearance.

If there is one branch of our study which has shown a tendency to unusual development during the past year, it is that which deals with those problems to which the minds of men have been turned by the researches of Darwin, Wallace, Weismann, Meldola, Poulton, and many others. Already, not only here, but on the Continent, these subjects

have claimed, and have created, a literature of their own. Such literature must be especially interesting to us, because, in the case of many of the theories advanced, there is a strong tendency to throw the burden of proof upon facts and deductions connected with entomological science. Already we have to welcome a new publication devoted entirely to such subjects. The 'Entomologist's Record and Journal of Variation,' edited by Mr. Tutt, has appeared within the year; and Mr. Poulton has lately added another valuable contribution to the elucidation of Darwinian problems. His book on the meaning and use of the colours of animals, —one of the volumes of the International Scientific Series,— has special reference to Entomology. However guarded we may be in the degree of acceptance accorded to the theories he seeks to advance, we cannot but be greatly interested in his admirable summary of the work already done, and in his excellent attempt to corroborate, by new observations and experiments, many of the conclusions already more or less generally accepted.

With regard to the uses of colour in insects for protective, aggressive, or attractive purposes, so much has been said and written that it seems difficult to add any new suggestion; but there is one point to which only a slight allusion is made in Mr. Poulton's book, and which I do not remember to have seen insisted upon elsewhere,—*viz.* the value of bright colours, temporarily displayed, as a means of increasing the degree of security derived from protective tints. My attention was lately drawn to a passage in Herbert Spencer's 'Essay on the Morals of Trade.' He writes:—"As when tasting different foods or wines the palate is disabled by something strongly flavoured from appreciating the more delicate flavour of another thing afterwards taken, so with the other organs of sense, a temporary disability follows an excessive stimulation. This holds not only with the eyes in judging of colours, but also with the fingers in judging of textures."

Here, I think, we have an explanation of the principle on which protection is undoubtedly afforded to certain insects by the possession of bright colouring on such parts of their

wings or bodies as can be instantly covered and concealed at will. It is an undoubted fact, and one which must have been observed by nearly all collectors of insects abroad, and perhaps also in our own country, that it is more easy to follow with the eye the rapid movements of a more conspicuous insect soberly and uniformly coloured than those of an insect capable of changing in an instant the appearance it presents. The eye, having once fixed itself upon an object of a certain form and colour, conveys to the mind a corresponding impression, and if that impression is suddenly found to be unreliable the instruction which the mind conveys to the eye becomes also unreliable, and the rapidity with which the impression and consequent instruction can be changed will not always compete successfully with the rapid transformation effected by the insect in its efforts to escape.

I would take as a simple illustration the case of certain species of large grasshoppers (*Œdipoda miniatum*, Pallas, and *cærulescens*, L.), familiar to all who have traversed the stony slopes of a Swiss mountain. These insects have bright red or blue hind wings, which are displayed only in flight, and when at rest are folded up and completely concealed under the fore wings. The fore wings themselves are essentially protective in their coloration, absolutely resembling the grey stones amongst which they rest. When the insect is disturbed, it takes a short and rapid flight, remaining on the wing just long enough to attract the eye to its conspicuous colour, and alights suddenly and abruptly, usually at an angle from its direct line of flight, and is immediately concealed by its protective resemblance to the surroundings. The very sudden loss of the conspicuous guiding colour of the hind wings so completely deceives the eye that there is much more difficulty in marking the spot on which the insect alights than there would be if such colour had never been displayed. In California I noticed a very similar instance in one of the *Arctiadæ* (or *Catocalidæ*), which had precisely similar habits. It frequented the dry stones in the bed of a river left by the shrinking of the water to its summer limits. It had orange hind wings with black bars or mottlings, which were very conspicuous during its short flights, but on alighting

it became almost absolutely invisible; the fore wings being coloured exactly as the stones among which it dropped, and from which it was not easily disturbed.

In our own country we have conspicuous instances in the genera *Catocala*, *Triphæna*, *Heliodes*, and others. Who has not noticed the deceptive effect of the bright yellow under wings displayed in the short flights of *Triphæna pronuba*, and the extreme difficulty of following its movements at the moment when these are no longer visible, as it darts down among the grass-roots, where it is often extremely difficult to detect or to dislodge? If this protective effect of the partial and intermittent display of brilliant colouring is so obvious in relation to the human eye, must it not be at least equally so in relation to the eyes of its more natural enemies, such as birds, and have we not here indicated a new and distinct line of investigation as regards the use and advantage of brilliant colours in many cases which cannot be accounted for by the theory that they are developed for the purpose of warning, or through their æsthetic relation to courtship? Mr. Poulton has attempted to account for some of these appearances by the idea that birds in pursuit of insects would strike with their beaks at the most conspicuous part, and that the body or more vital part would be thus protected at the expense of a few chips out of the hind wings; but in some instances, especially in exotic *Arctiadæ*, the body itself is the more conspicuous and ornamented part of the insect. For such cases this theory, however partially true it may be, would fail to account; moreover, it can scarcely be denied that the insect, if less conspicuous in its flight, would be less likely to attract the attention of the bird, and therefore less liable to attack.

Now in the same way it may possibly be shown, and I merely indicate it for what it is worth as an interesting line of enquiry, that insects with bright metallic markings or colours may derive some advantage from a power of rendering themselves suddenly inconspicuous by altering the angle at which the light strikes their scales. That they are aware of the effect of such changes of position is suggested by Mr. Poulton himself when observing that the angle at which the

highly ornamented males of certain butterflies place themselves in courtship is that at which their brilliant colours are rendered most conspicuous to the eyes of the females, and it is easily conceivable that the same power exercised in an opposite direction may be deceptive to the eye of an insectivorous bird. I think it would not be difficult to find instances where the markings of animals and birds have somewhat the same protective effect.

I was much struck with the observation of a friend who described to me the habits of a family of wild badgers which he had watched coming out of their holes to feed after dark. He observed that when the badger turned its head sideways to look in his direction, the white marks at the sides of the head were at once conspicuous and attracted immediate attention, but that when its suspicions were aroused the head was immediately turned away, and the outline of the animal in the dusk of evening was lost to the eye as it moved slowly and noiselessly away. His impression was that it would have been far more easily followed if the eye had not been tempted to continue the search for the more conspicuous though smaller object.

I could name many instances in which the colouring on the under sides of the wings and breasts of birds, especially of wildfowl, undoubtedly gives them an advantage in being able to render themselves suddenly inconspicuous against the background of a clear sky. In the wintry weather we have had of late, I have seen teal and widgeon disturbed by a sudden shot or pursued by a falcon. In such cases they instantly alter the angle of their flight, throwing themselves sideways in such a manner that the pale under colour protects them from view in their rapid movements as it is suddenly and frequently displayed against the white snow-clouds.

An especially interesting line of enquiry as connected with the use and value of colour in insects is that which has been followed up in Mr. Tutt's series of papers in the 'Entomologist's Record.' The special object of these papers appears to be a discussion of the causes which tend to produce melanism and melanochroism in our British Lepidoptera, and, so far as

the conclusion he comes to has been indicated up to the present time, he seems to declare in favour of the theory that such varietal changes are due to the action of moisture. A valuable paper was read by Mr. Merrifield at one of our last meetings, giving an account of some interesting experiments carried out upon the pupæ of certain *Geometridæ*, in which the temperature was artificially raised or lowered, excess of cold producing the darker coloration of the winter brood, with the reverse effect under the opposite conditions. Mr. Merrifield's experiments were entirely conducted with seasonally dimorphic forms, as also were those of W. H. Edwards and Weismann, and although the power of producing artificially certain recognised varieties was still questioned by some of those who heard him, I think his carefully conducted researches went sufficiently far to prove that retardation of development does produce a tendency to darker colouring where such colouring is distinctly seasonal. Nevertheless it must be remembered that no attempt has yet been made to establish by experiment any theory that variation in the direction of melanism can be encouraged in insects not seasonally dimorphic, but subject to such variation under natural climatic conditions.

Mr. Tutt, referring to a paper of my own in which I called attention to the tendency to melanism exhibited by Arctic and Alpine Lepidoptera, points out that insects from high latitudes are not generally melanic. I think I may at once admit that I had used the term "melanic" somewhat incorrectly in this connection; what I desired to point out was the general tendency of Arctic Lepidoptera to a certain suffusion of markings, and to an increase in the proportion of dull or dingy scales calculated more rapidly to absorb heat than the purer white of more southern varieties. Such a tendency will, I think, be admitted to exist, but I am aware it is far more conspicuous in many insular and alpine districts; and while I cannot agree that the arguments put forward in that paper are in any way undermined by this admission, or that the advantage secured to the species by the development of colour capable of rapidly absorbing heat has been in any way disproved, I am quite willing to accept

Mr. Tutt's assertion that melanism does not habitually occur unless lower temperature is accompanied by increased humidity; qualifying the acceptance only by suggesting that anything which would have the same effect as increased humidity in diminishing the action of sunlight will probably be found to produce the same results.

There are many local circumstances which cause an interference with direct sunshine; dense forests occur where the full rays of the sun never penetrate, clouds and mist accumulate around the summits of high mountains, fog and smoke envelop the districts immediately surrounding our manufacturing towns, islands in a temperate climate are subject to condensation of moisture and sea-fogs, and under all these circumstances dark varieties of certain species are known to occur, although the same species when found under different conditions more favourable to the action of light are usually less intensely coloured. But if moisture is to be taken as a direct, rather than an indirect, cause, we should expect to find melanic variation occurring in the swamps of Tropical Africa, in the forests of the Amazons, on the banks of the Mississippi, and in many other damp climates, even within tropical regions, and I am not aware that this is the case.

It has been pointed out that no variation in the direction of melanism has been found to occur in dry open level tracts, however far north these may be; and this fact, although it tends to show that cold is not by itself a potent cause of such variation, is perfectly consistent with the theory that diminished sunlight exercises a certain influence upon the direction in which colour may be expected to, and does, vary.

It cannot be too freely admitted that in all cases of supposed natural selection, accompanied by advantage to the species, such advantage is probably by no means the sole and exclusive cause of, or inducement to selection—all the special conditions under which the species exists must be taken into consideration, and any inclination to overrate the active value of one special condition should be carefully discounted. The study of such supposed causes and effects is yet in its infancy, and although the promising child has "grown apace"

under the loving care of its numerous admirers, it has by no means arrived at maturity; on the other hand, no jealous or disparaging critic can at present be justified in putting it down as an "ill weed."

The only conclusion that I would venture to maintain, in regard to this very wide subject, is that variation of colour in the direction of melanism, melanochroism, or such suffusion of markings as can appreciably affect the rapidity of heat-absorption by the wing-surface of any insect, is very generally proportionate to the degree of interference with the direct action of sunlight caused by climatic or other conditions to which the insect is exposed, and that such interference may have a more or less immediate, or only a very gradual effect upon the variation of species. We have yet to ascertain how far such effect is assisted by a process of natural selection, and whether such natural selection is exercised for the sake of protective resemblance, or for the advantage derived from an increased power of heat-absorption, or whether it is produced by the direct chemical action of the visible or invisible rays of the solar spectrum.

I sincerely wish that Mr. Poulton, or Mr. Merrifield, or some of those gentlemen who have time and opportunity for studying this question, would carry out an experiment originally put into my head by Sir John Lubbock, *viz.*, the rearing of some of our variable *Geometridæ*, such as *Gnophos obscuraria*, *Cidaria russata*, or some of the species of *Melanippe* or *Hybernia*, guarding them in the larval and pupal stages by hyposulphide of carbon or bichromate of potash from the action of the ultra-violet rays of the sun, which are supposed by many to have such a strong chemical effect upon the colouring matter in the scales, or on the chlorophyll in the pigment of the larvæ. If it were found that under such conditions any appreciable change could be made in the percentage of dark as compared with paler varieties, it would go far to prove that melanic variation cannot be attributed to the direct influence either of cold or moisture, but rather to the indirect influence of the two combined; and the facts, so far as they are at present known, point, I think, somewhat forcibly to this conclusion.

An International Zoological Congress has been held at Paris during the past year, at which the rules of nomenclature have been once more reviewed and revised.

The resolutions passed at that Congress are not at variance with the system usually adopted on the general lines of Strickland's Rules as approved by the British Association — indeed, they confirm them in all important particulars.

The only point to which it may be worth while to call attention is the rule dealing with what is known as "fixation of types."

Rule 28 of the International Code provides that "when the original type (of a genus) is not clearly indicated, the author who first subdivides the genus can apply the original name to such subdivision as he may judge convenient, '*convenable*,' and this attribution cannot be subsequently altered."

It may seem that a saving clause is here required, to provide for the possibility that sufficient evidence may be subsequently found to enable the original type to be clearly identified, and in that case any author should surely be entitled to re-establish the connection between the original generic name and the original type described, where such connection has been erroneously destroyed.

In doubtful cases the first name on the list of species placed under the original generic name has been habitually regarded as the type so long as it truly conforms to the full generic description, and the effect of the rule I have quoted might be to introduce many undesirable exceptions to this practice. In any case, you will all agree that the practice of ignoring altogether generic names given by early authors and substituting for the same typical species other more recently invented designations, is one which cannot but lead to confusion and cause waste of time to those workers who, while admitting the necessity for correction, would have preferred to add to the knowledge of the subject itself, rather than to the past history of those steps by which such knowledge has been arrived at. It would surely be preferable in such cases to expand the original description, retaining the generic name rather than to write a completely new description and

re-christen the genus; but in any case the actual type of the genus should always be indicated.

During the past year the Society has lost five Fellows by death :—

Mr. Joseph S. Baly, M.R.C.S., F.L.S., died in March, at the age of 73. He was elected to this Society in 1850, and was well known as the author of a large number of papers on Coleoptera, and especially as one of the foremost authorities on the *Phytophaga*. Formerly a medical student at St. George's Hospital, he was at least as well known in his extensive medical practice as for his valuable entomological studies; a large number of his types are now in the British Museum.

Mr. Arthur Bliss, who died at the early age of 32, joined our Society in 1885, and was formerly Secretary to the South London Entomological and Natural History Society.

Mr. William C. Copperthwaite had been a Fellow of the Society since 1876.

Monsieur l'Abbè S. A. de Marseul, one of the oldest members of the French Entomological Society, was well known as an eminent Coleopterist, and as the founder of the journal called 'L'Abeille'; he was also the author of an 'Essai Monographique sur la famille des Histerides,' and of a well-known catalogue of European Coleoptera. He joined our ranks in 1869.

Mr. Owen Wilson, a barrister by profession, was best known to the Society as the author of a work on the larvæ of British Lepidoptera and their food-plants.

Among those entomologists, not Fellows of this Society, who have passed away during the year, are many well-known names. In Mons. Lucien Buquet and Mons. Eugene Desmarest the French Entomological Society have had the misfortune to lose two of their oldest and most faithful officers; the former was no less than 45 years their Treasurer, the latter their Secretary since 1845.

Professor Heinrich Frey, M.D., one of the joint authors of the 'Natural History of the Tineina'; author of the 'Lepidoptera der Schweiz,' as well as of many valuable papers, especially on Micro-Lepidoptera, leaves our ex-Presidents, Mr. Douglas and Mr. Stainton, the only survivors of the four

joint-authors, of what was, as far as it went, a great classical work. He was the author, also, of many important papers on Histology and Microscopy, some of which have been translated into several languages. His valuable collection has been fortunately acquired by the Trustees of the British Museum.

Mr. E. T. Atkinson, Accountant-General of Bengal, and President of the Board of Trustees of the Indian Museum, died at Calcutta on Sept. 15th, after a short illness from Bright's disease. He was born at Tipperary on Sept. 6th, 1840, and passed into the Indian Civil Service in 1862. He held many important official appointments in India, amongst others that of Financial Secretary to the Indian Government. Between 1874 and 1879 he published a Gazetteer of the North-Western Provinces of India, and was also the author of works on Indian Law and kindred subjects. As an entomologist, he published two series of papers on Indian Rhynchota from 1885 to 1890, in the 'Journal of the Asiatic Society of Bengal,' and a series of Catalogues of the insects of the Oriental Region. One of his latest works was a bulky Catalogue of the *Capsidæ* of the world. He also started the 'Indian Museum Notes,' dealing largely with Indian Economic Entomology.

Dr. R. C. R. Jordan, a frequent contributor to the 'Entomologists' Monthly Magazine,' did not confine his studies to British Lepidoptera, but added to our knowledge of the general subject, whenever his short holidays from professional work gave him the opportunity of improving his European collection.

Mr. W. S. Dallas, F.L.S., and Assistant Secretary of the Geological Society, was formerly one of our Members, and the author of a book entitled 'Elements of Entomology,' published in 1857.

The names of Dr. L. W. Schaufuss, Dr. S. Nowicki, Oberstlieutenant Max Saalmüller, Dr. Alfred Walter, Dr. Hermann Dewitz, Mons. Louis Reiche, Herr Peter Maassen, Mr. C. G. Hall, and Mr. W. B. Farr, are all more or less well-known in the entomological world.

In conclusion, I have to return to each and every Fellow of this Society, my cordial thanks for the indulgence with

which they have treated me, during the time I have had the honour of occupying the Presidential chair.

I shall look back to the two years now past, not without some regrets that the attention I have been able to devote to my duties has been less than I should have wished, but certainly with much satisfaction that, personally, our relations have been throughout of the most peaceful and cordial character. For this I have not only to thank the Society as a whole, but especially the official members of it. To Mr. Goss I am greatly indebted for the willing assistance he has so heartily rendered me at all times, as I am also to Canon Fowler and to Mr. Grut, as well as to the Council and other officers of the Society.

It has been a matter of great regret to the Council, that the state of Mr. Saunders' health will no longer permit him to devote to this Society that active and efficient service for which they have been so long indebted to him. No one has more richly deserved the hearty vote of thanks which you will presently be asked to accord to him.

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Owing to the greater length of the 'Proceedings' for 1890, and the much larger number of species simply catalogued or alluded to, a different arrangement of the Index has been adopted, which, it is hoped, will be found more convenient; the new species, and those which have been redescribed, as well as the more important ones alluded to, will be found in detail as before, whereas the General Index will be found *generically* arranged under the headings of the various papers that have been published during the year.

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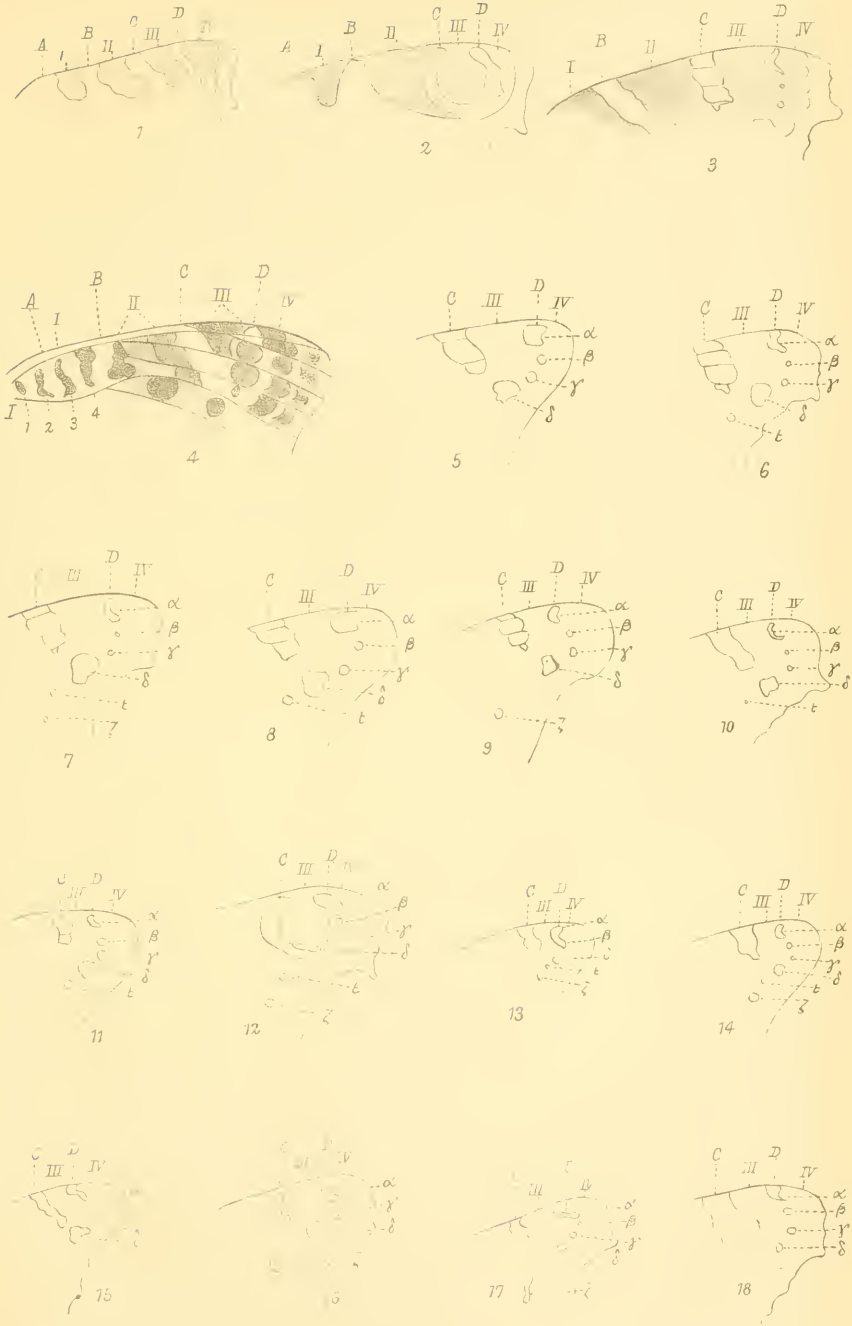

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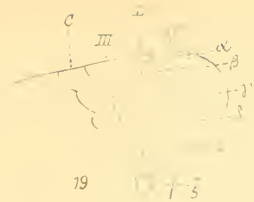

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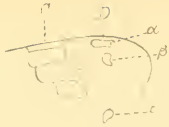

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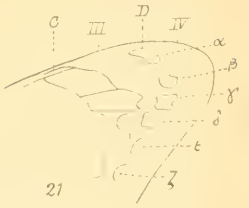

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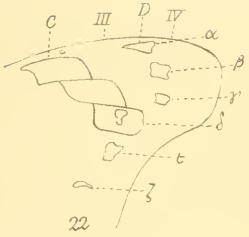

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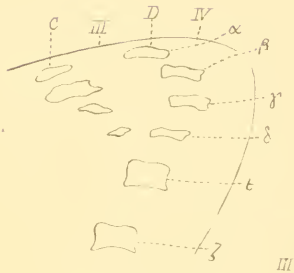

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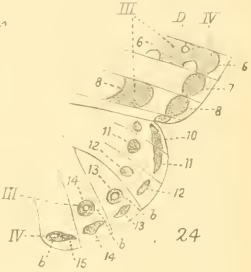

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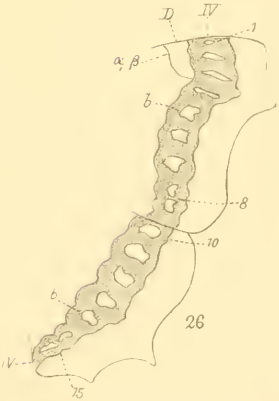

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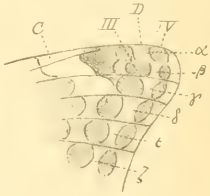

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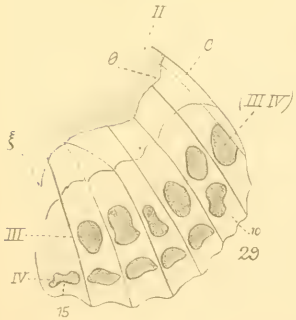

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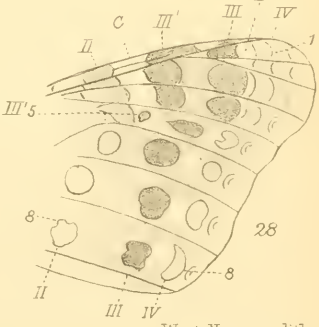

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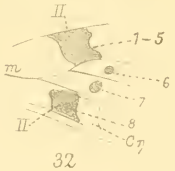

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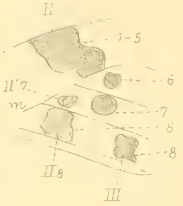

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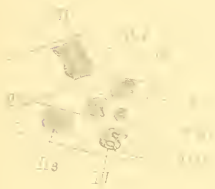

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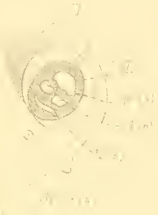

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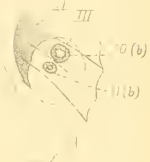

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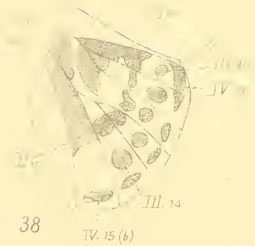

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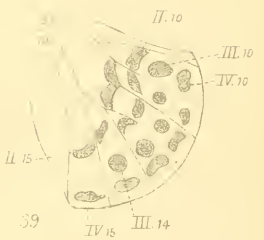

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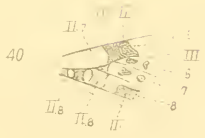

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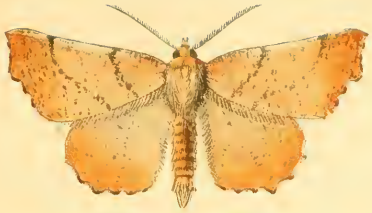

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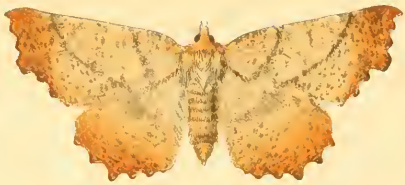

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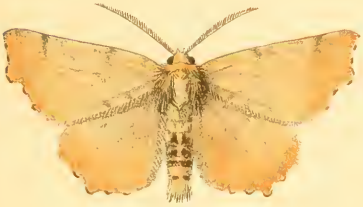

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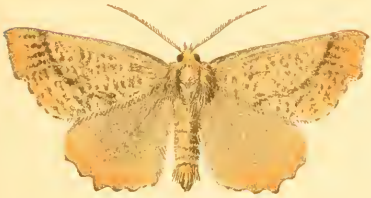

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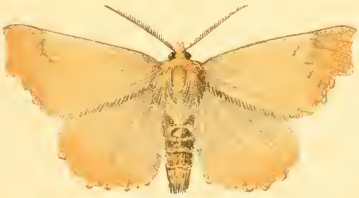

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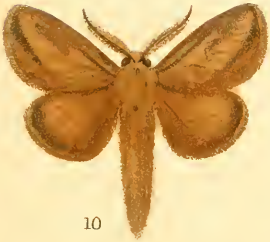
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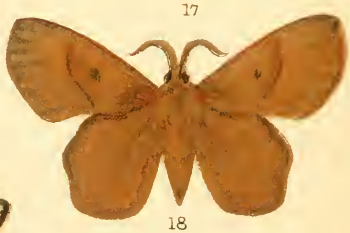
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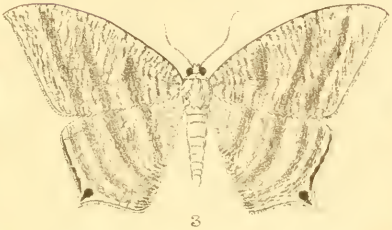
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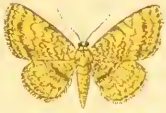
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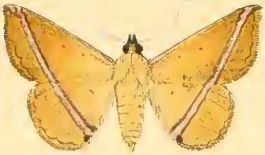

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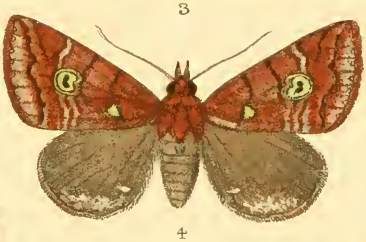

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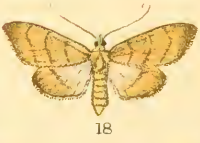

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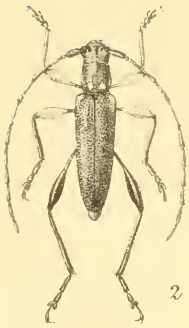
New Burmese Lepidoptera.

1



2

3

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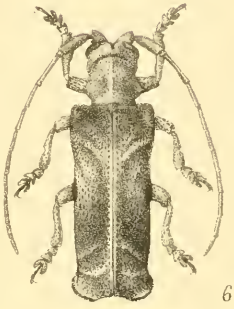

6

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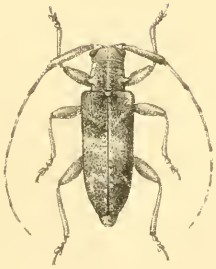
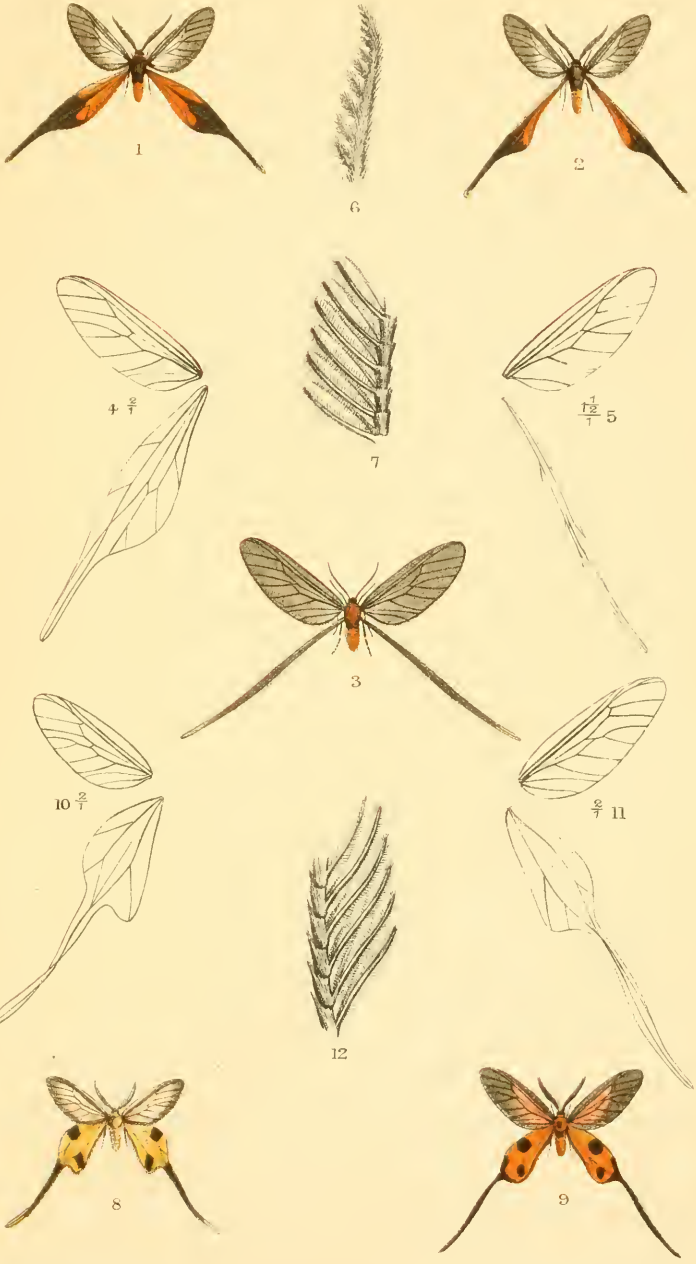


7

8

West, Newman lith.

New African Longicornia.



F.W.Frohawk del.et lith.

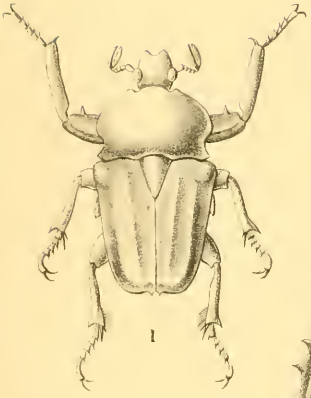
West, Newman chromo

Species of Thymara.

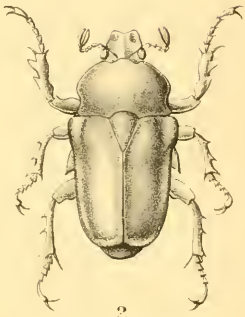
3b

3

3a

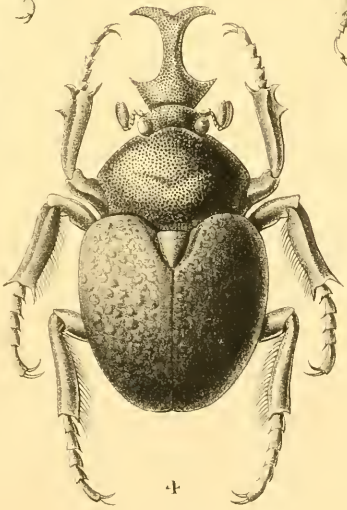


1



2

1b.

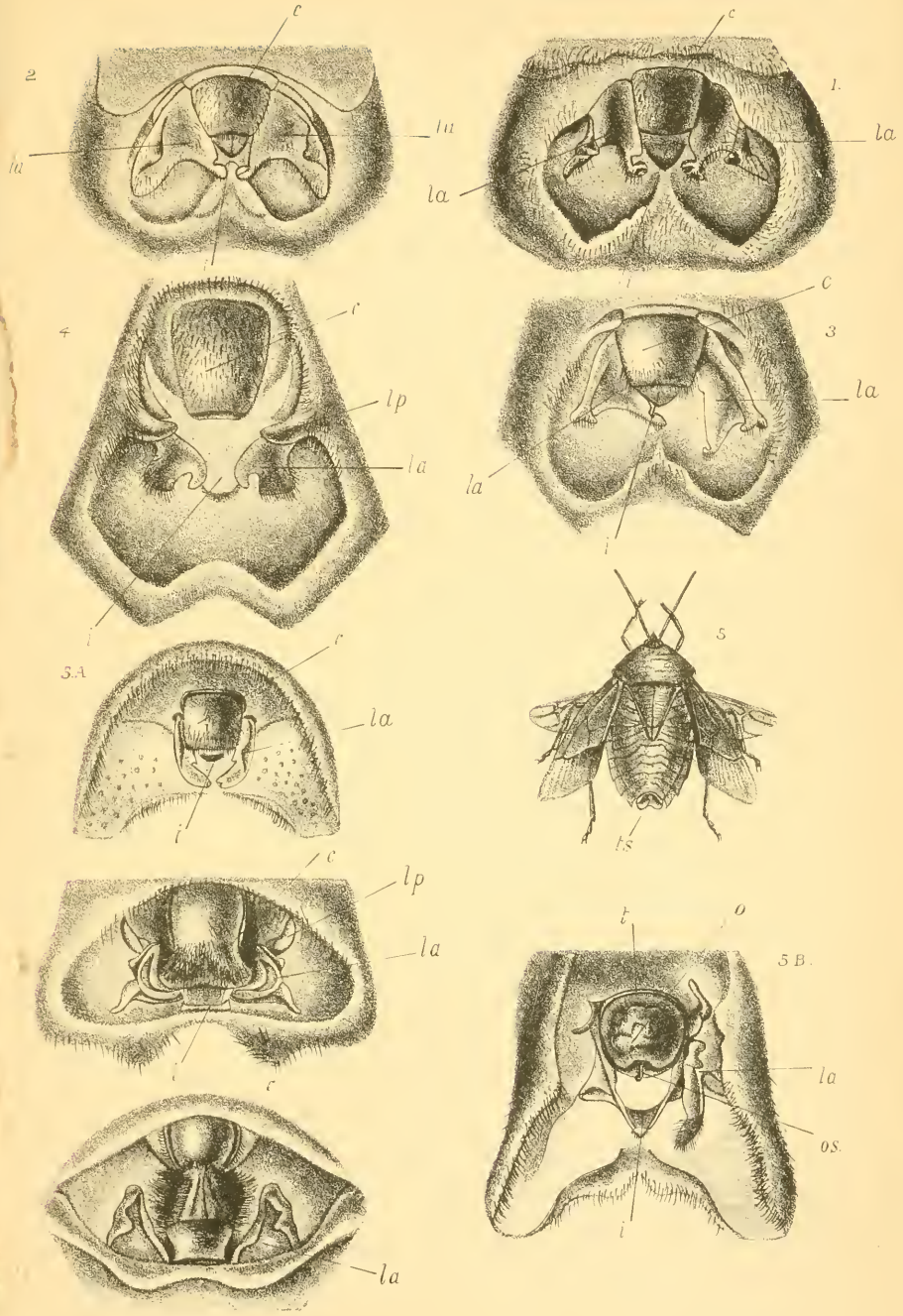


4

1a

Mintern Bros. lith

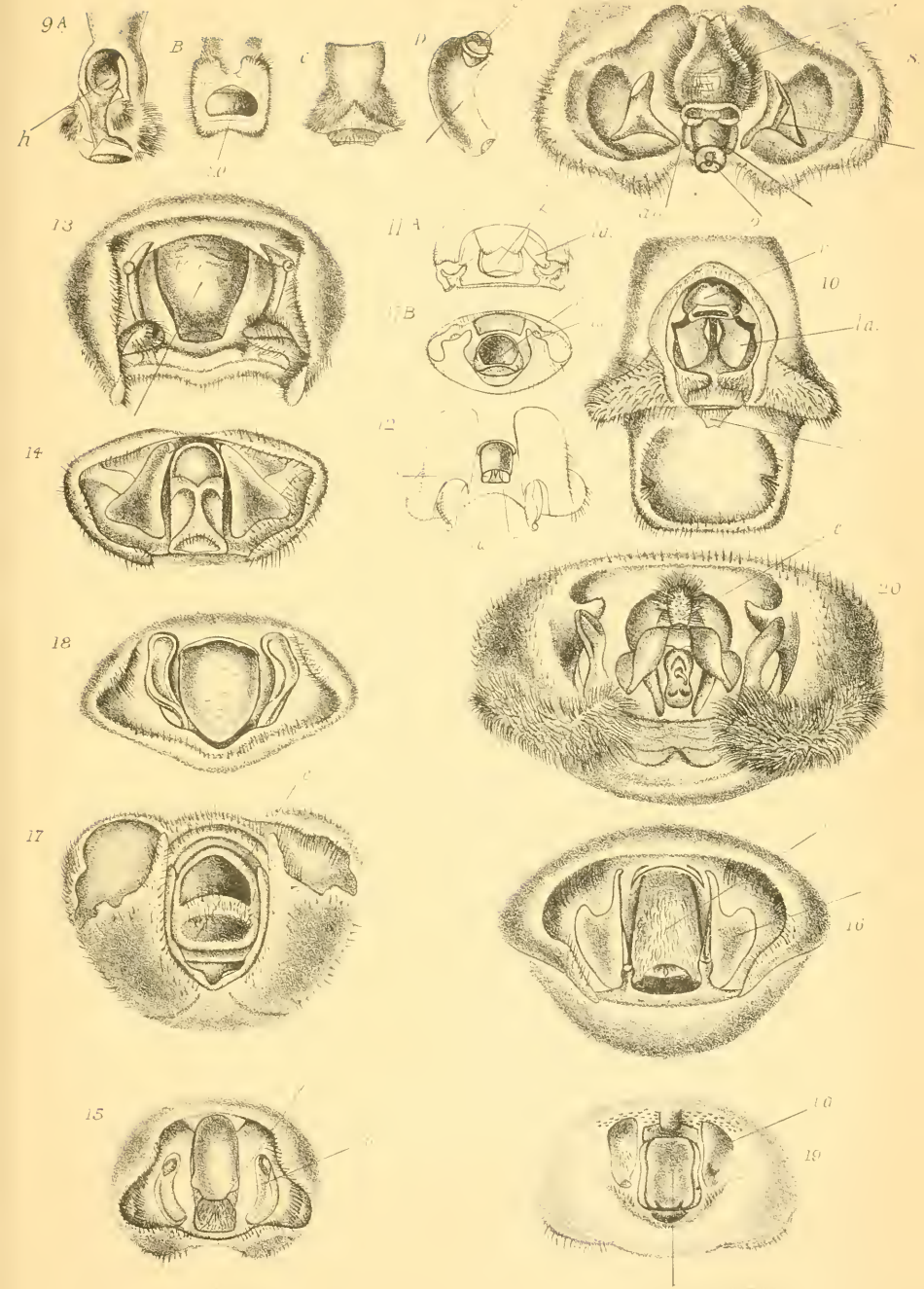
Species of Cetoniidæ.



Constance Hoskyns-Abrahall Lith ad Nat.

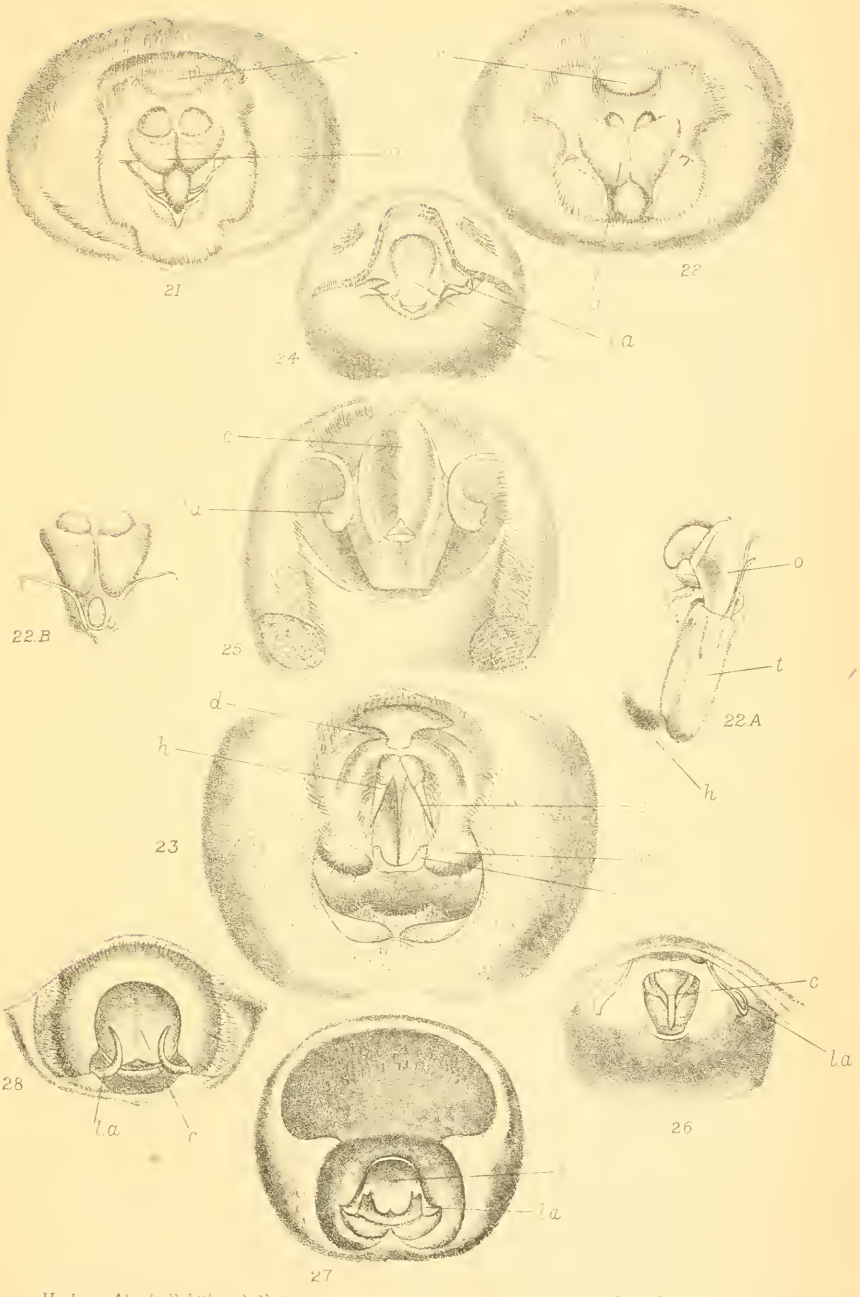
Imp. J. Galloway & Son, Manr.

Terminal Segments of Hemiptera



Constance Hoskyns-Abrahall Lith. ad Nat

Terminal Segments of Hemiptera



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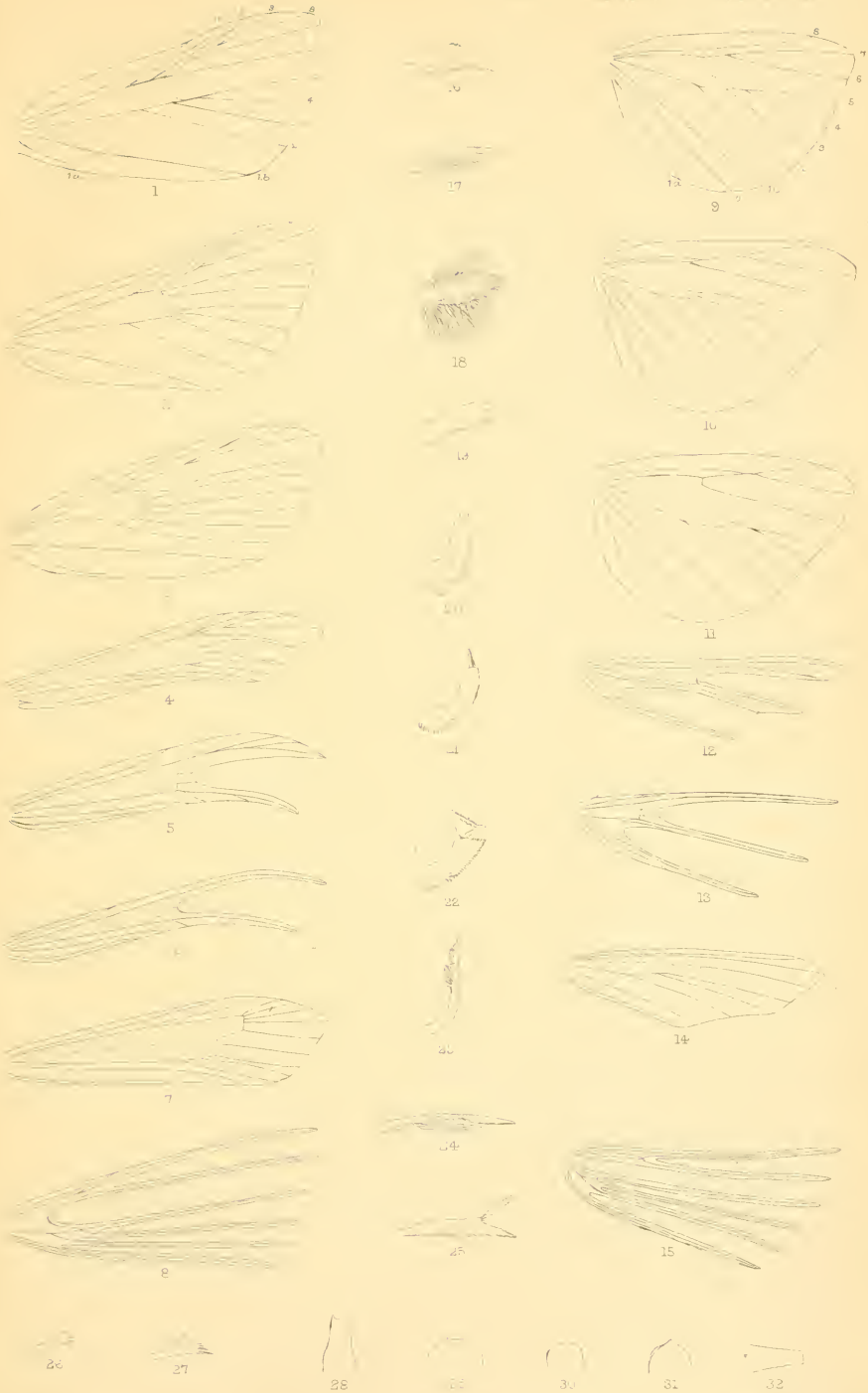
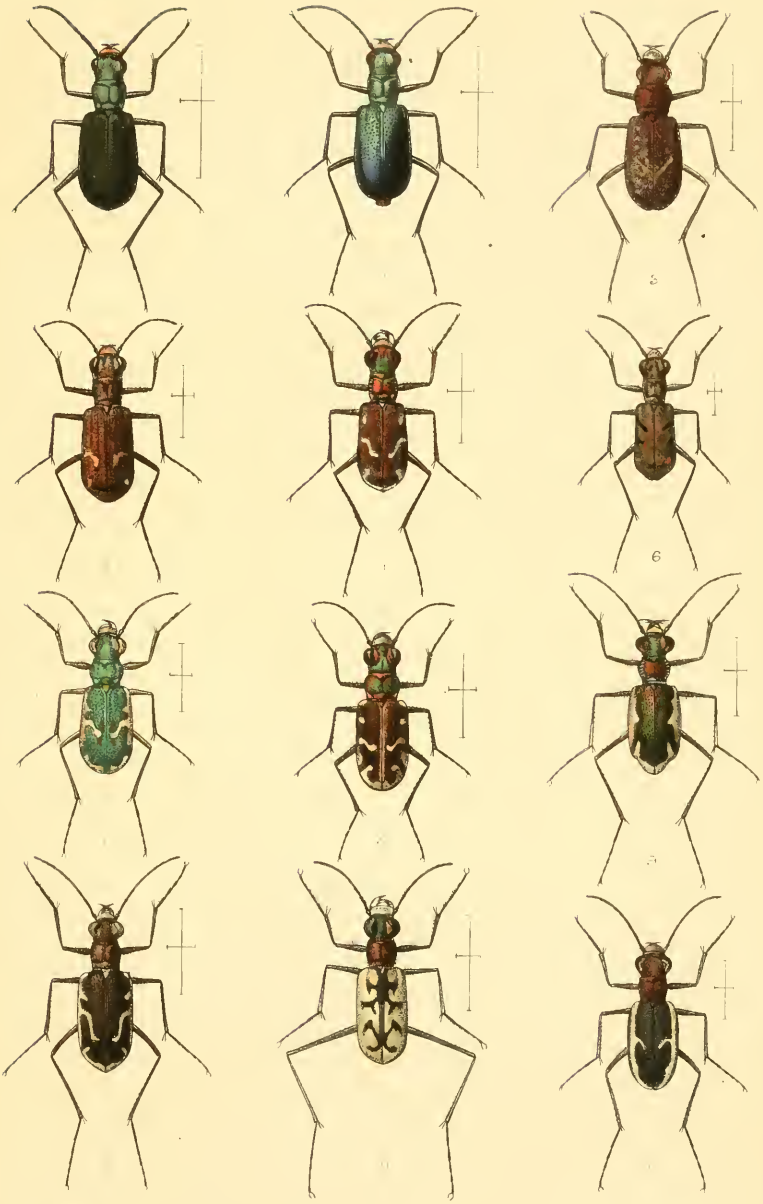


West Newman sc.

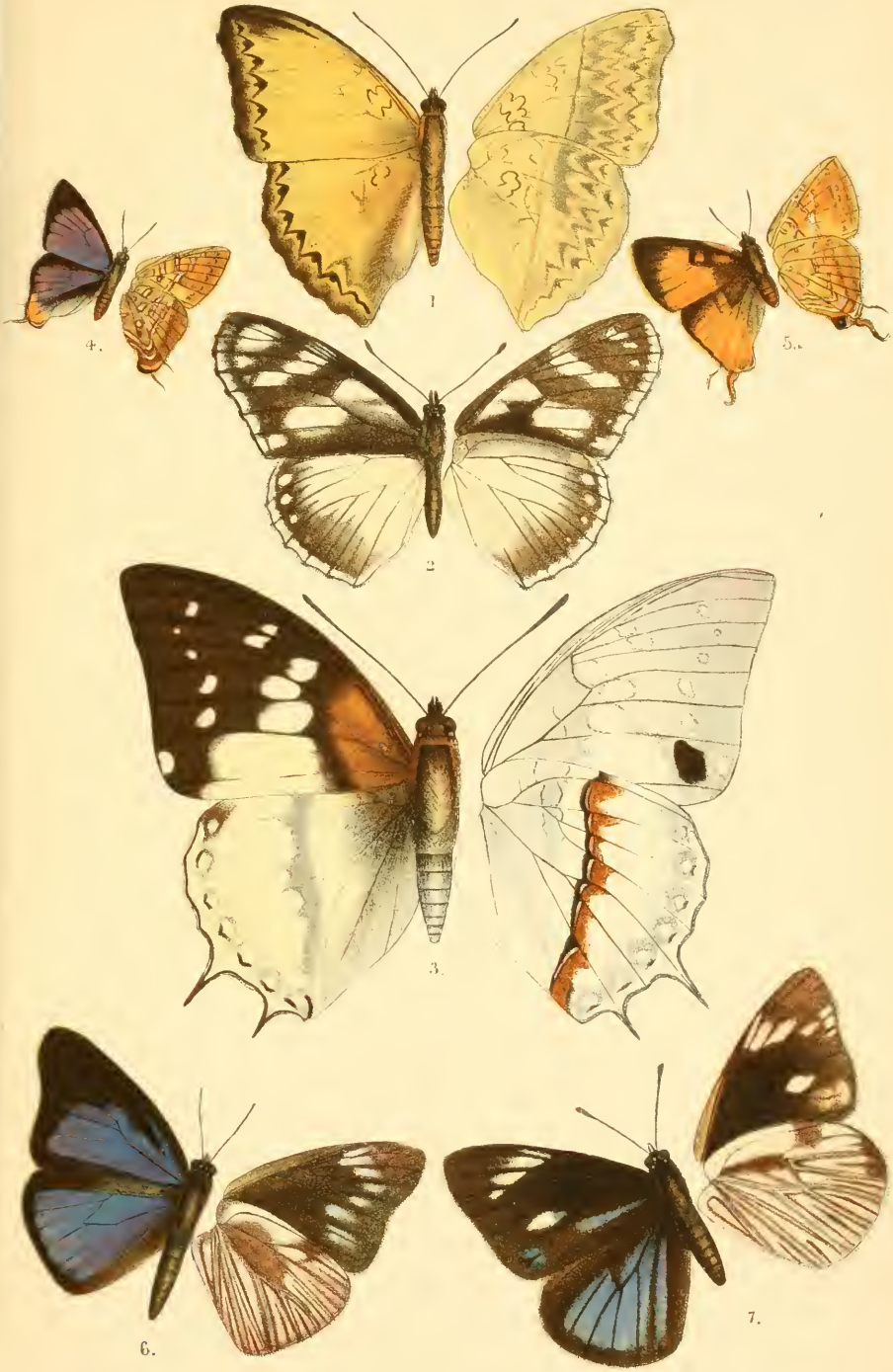
Wings &c. Palpi of Pyralidine



W Purkis, lith

West, Newman imp

New species of Cicindela from Mexico



Maud Horman fish r del et lith.

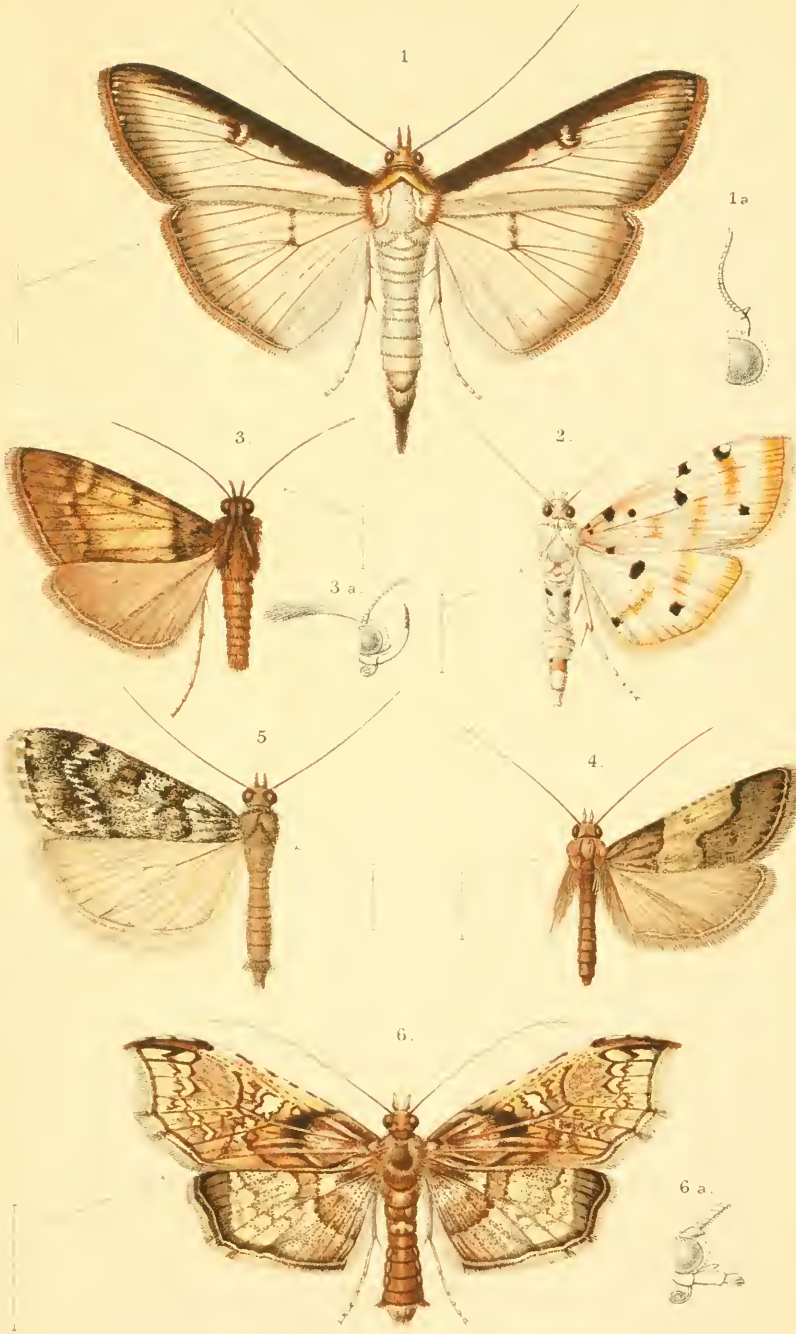
Mintern Bros

New African Lepidoptera

Maud Horman-Fisher del. et lith.

Mintern Bros

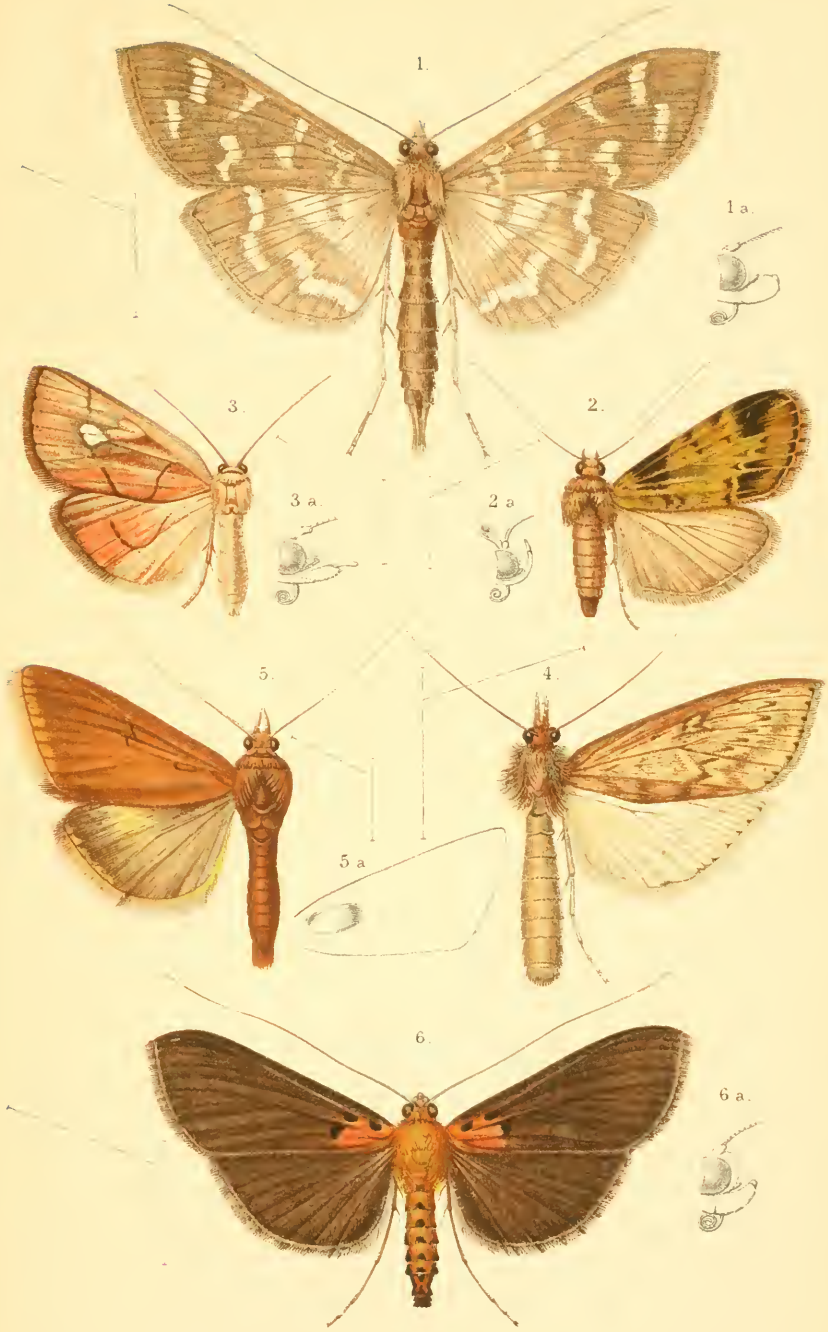
New African Lepidoptera.



H W de Graaf del. A J Wendel lith

P W M Trap Chromo.

Sikkim Pyralidina.



H. W. de Graaf del. A. J. Wendel lith.

P. W. M. Trap. Chromo.

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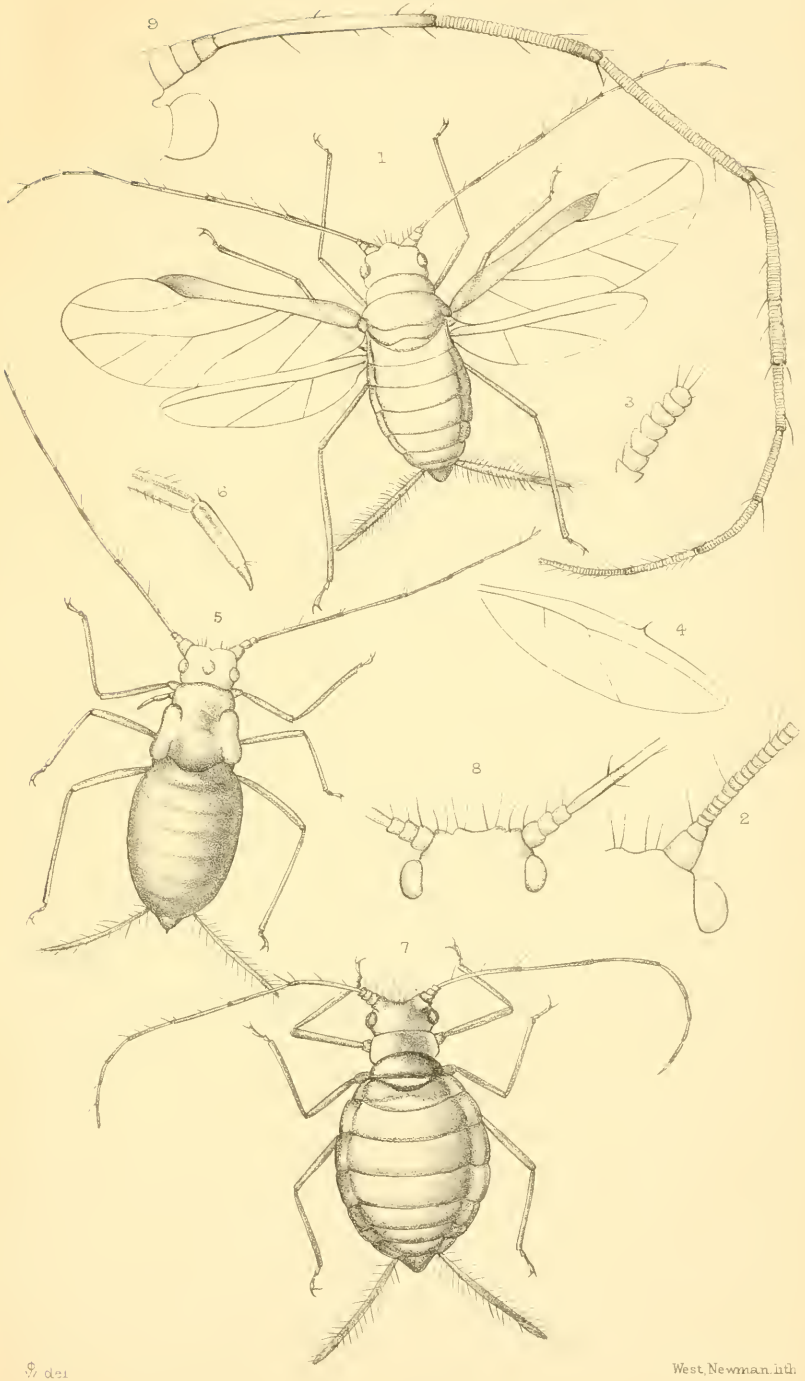

G. del.

West, Newman lith.

Siphonophora artocarpi

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